



COMMERCIAL FISHERIES ABSTRACTS

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UNITED STATES DEPARTMENT OF THE INTERIOR
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BUREAU OF COMMERCIAL FISHERIES



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<p>0.321 (6.54)</p> <p>STRUCTURAL STABILITY AND SOLVENT DENATURATION OF MYOGLOBIN</p> <p>Herskovits, Theodore T., and Helene Jalliet (Department of Chemistry, Fordham University, New York, N.Y. 10458) Science <u>163</u>, No. 3864, 282-285 (January 17, 1969)</p> <p>The importance of hydrophobic interactions for altering the native structure of proteins and nucleic acids in solution has been reported by several researchers over the past decade. The effects of various structurally related denaturants on the conformational stability of deoxyribonucleic acid have also been reported. Three-dimensional structures of sperm-whale myoglobin and other proteins have been obtained in fairly complete detail by X-ray crystallography; such structures indicate the location of the various amino-acid side chains. A knowledge of the effectiveness of structurally related denaturing agents (such as amides, ureas, alcohols, and glycols) on these proteins should clarify the nature of the forces that control native structure as well as lead to a better understanding of hydrophobic interactions. The present report concerns the denaturation of sperm-whale myoglobin by solvents.</p> <p>The denaturing effectiveness on sperm-whale myoglobin of 31 water-miscible alcohols and glycols, urease, and amides--judged in terms of the denaturation midpoint, that is, the molar concentration of denaturant required to produce a 50-percent change in the particular experimental feature that has been chosen to show the denaturation transition of the reagent--increases as the chain length and (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 22 NO. 12 PAGE 1 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: L. Baldwin</p>	<p>0.35</p> <p>LIPID PEROXIDE FORMATION IN MICROSOMES. THE ROLE OF NON-HAEM IRON</p> <p>Wills, E. D. The Biochemical Journal <u>113</u>, No. 3, 325-332 (June 1969)</p> <p>Because the microsomal fraction of liver readily forms lipid peroxide on incubation with NADPH (reduced nicotinamide adenine dinucleotide phosphate) or ascorbate, it is likely that inorganic (nonhem) iron is an essential component of the system.</p> <p>The present paper reports on a study of the role of inorganic iron as a catalyst or as a part of a catalytic system for the peroxidation of unsaturated lipids.</p> <p>Metal ion-chelating agents [such as EDTA (ethylenediaminetetraacetate), O-phenanthroline, or desferrioxamine] inhibit lipid peroxide formation when microsomes of rat liver (prepared from homogenates made in pure sucrose) are incubated with ascorbate or NADPH. Microsomes that were treated with metal ion-chelating agents do not form peroxides on incubation unless inorganic iron (Fe^{++} or Fe^{+++}) in a low concentration is added subsequently. No other metal ion can replace the inorganic iron. Microsomes prepared from sucrose homogenates containing EDTA do not form lipid peroxide on incubation with ascorbate or NADPH unless Fe^{++} is added. Formation of lipid peroxide in microsomes prepared from sucrose is stimulated to a small extent by inorganic iron but to a greater extent if adenine nucleotides, containing iron compounds (as a contaminant), are added. The iron in normal microsome preparations exists in hem and in nonhem forms. One nonhem component (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 22 NO. 12 PAGE 1 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: F. T. Piskur</p>
<p>0.35</p> <p>LIPID PEROXIDE FORMATION IN MICROSOMES. GENERAL CONSIDERATIONS</p> <p>Wills, E. D. (Department of Biochemistry, Medical College of St. Bartholomew's Hospital, London E.C.1, England) The Biochemical Journal <u>113</u>, No. 2, 315-324 (June 1969)</p> <p>Lipid peroxides (measured by the thiobarbituric acid method) are formed in homogenates of many different tissues after incubation. Separated nuclei, mitochondria, lysosomes, and microsomes of liver form lipid peroxides after incubation, but apparently the quantity and rate of lipid peroxide formed in the microsomal fraction are much greater than in the other fractions.</p> <p>Lipid peroxides may be an important factor causing, or a stage in, general membrane damage, and they have been, in fact, implicated in damage to mitochondrial membrane, the erythrocyte membrane, the lysosome membrane, and the endoplasmic reticulum of liver cells by carbon tetrachloride.</p> <p>In view of the capacity of the microsomal fraction to form large quantities of lipid peroxide, and because peroxide formation may be important in the overall metabolism of endoplasmic reticulum or its destruction <i>in vivo</i>, the author made a detailed study of the factors affecting, and possible mechanisms of, the process in the microsomal fraction. He paid special attention to NADPH (reduced nicotinamide adenine dinucleotide phosphate)-induced peroxidation as this may be linked to microsomal hydroxylation.</p> <p>The author concludes that the results are in agreement with the concept that the electron-transport chain of the microsomes normally concerned with hydroxylation can be switched to oxidize unsaturated lipids of the endoplasmic reticulum and that this oxidation produces lipid peroxides. The ascorbate supplies (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 22 NO. 12 PAGE 1 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: F. T. Piskur</p>	<p>0.35</p> <p>LIPID PEROXIDE FORMATION IN MICROSOMES. RELATIONSHIP OF HYDROXYLATION TO LIPID PEROXIDE FORMATION</p> <p>Wills, E. D. The Biochemical Journal <u>113</u>, No. 2, 333-341 (June 1969)</p> <p>The microsomes of the liver are the site of oxidative metabolism of many aromatic compounds, steroids, and drugs (Williams, 1959). The process requires NADPH (reduced nicotinamide adenine dinucleotide phosphate) as a source of electrons (Brodie, Gillette, and La Du, 1958), and the oxidation is a result of the operation of a microsomal electron-transport chain (Siekevitz, 1966; Ernster and Orrenius, 1966).</p> <p>Wills (1969) found that when microsomes are incubated with NADPH there is a rapid production of lipid peroxide, and it appears that the two processes of peroxidation and hydroxylation are closely linked and may be the result of the operation of the same electron-transport chain. In the present study, the author made an attempt to determine the role of lipid peroxidation in the hydroxylation process.</p> <p>From the results, the author believes that the two processes of hydroxylation and lipid peroxide formation in microsomes are closely linked. The two processes probably depend upon the same electron-transport chain, and peroxide formation (involving membrane disintegration) may be part of the normal membrane remodeling process.</p> <p>[8 figures, 6 tables, 15 references]</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 22 NO. 12 PAGE 1 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: F. T. Piskur</p>

Hsia, J. C., and L. H. Plette (Department of Biochemistry and Biophysics, School of Medicine, University of Hawaii, Honolulu 96822)
Archives of Biochemistry and Biophysics 132, No. 2, 466-469 (July 1969)

In this study, ESR (electron spin resonance) spin-labeling was used to probe the structural heterogeneity of rabbit anti-DNP antibodies (anti-2,4-dinitrophenyl antibodies). The authors made use of the variation in maximal splitting (A_{\max}) of the spin-labeled hapten-antibody complex spectra as a criterion for structural or orientational variations within the antibody active site. (A_{\max} is the maximum splitting between the high and low field peaks of the anisotropic ESR spectra of the spin label in units of gauss.) The authors aimed to prepare a series of between the spin-label and the hapten, that could be used to study different antibody populations. The high affinity (average intrinsic association constant $K_0 \sim 10^8$) of the anti-DNP antibodies was used to advantage to obtain well-resolved anisotropic ESR spectra of the antibody spin-labeled hapten complexes

The antibodies isolated with homologous and cross-reacting antigens yield different degrees of immobilization when bound with a homologous spin-labeled hapten. Different degrees of immobilization are noted between cross-reacting haptens and homologous haptens.

[Abstracter: F. T. Piskur]

[2 figures, 9 references]

0.35

(in which the iron may be linked to phosphate) appears to be essential for both the ascorbate system and NADPH system that catalyze lipid peroxidation in microsomes.

[1 figure, 7 tables, 13 references]

[3 figures, 18 references]

[Abstracter: F. T. Piskur]

thors found tLDD/DDD ratio for sheep fat methyl pristanates to be 0.70, whereas the ratio for methyl pristanates was 0.67. They observed no diastereoisomers other than LDD and DDD and postulated that the ratios determined for LDD and DDD pristanic acids as the methyl esters are valid for fats of terrestrial origin, where such fats do not reflect a diet rich in fatty acids of marine origin.

Pristanone (2,6,10,14-tetramethylpentadecane) is a trace component in fats of terrestrial animals and appears to be functional only in a few special cases such as wool wax. Fats and lipids in terrestrial animals are not continuously recirculated through various trophic levels as they are in the aquatic animals. Any diastereoisomers of pristanic acid formed by random terminal oxidation of pristane, therefore, are not as likely to accumulate, relative to those more directly derived from phytol, to an extent comparable with the aquatic environment. The authors found the IDD/DDD ratio for sheep fat methyl pristanates to be 0.70,

Biochimica et Biophysica Acta, Lipids and Lipid Metabolism 176, No. 3, 673-675 (April 29, 1969)

ACKMAN, N. G. *Marine Laboratory, Fisheries Research Board of Canada, Halifax*
 Nova Scotia), M. Kates (*University of Ottawa, Ottawa, Ontario, Canada*), and
 R. P. Hansen (*Department of Scientific and Industrial Research, Wellington,*
New Zealand)

DIASTEROISOMERIC COMPOSITION OF PRISTANIC ACIDS OF MARINE AND TERRESTRIAL ORIGIN

0.32

SYNTHESIS AND CHARACTERIZATION OF THE FLUORESCENT PRODUCTS DERIVED FROM MALONALDEHYDE AND AMINO ACIDS

Chio, K. S., and A. L. Tappel (Department of Food Science and Technology, University of California, Davis 95616)
Biochemistry 8, No. 7, 2821-2827 (July 1969)

Dialdehyds can react bidirectionally with proteins to give inter- and intramolecular crosslinking. Guiocho and Richards (1964) found that crystals of carboxypeptidase A, when reacted with glutaraldehyde (a dialdehyde), become completely insoluble in 1M NaCl and show a marked increase in mechanical strength. They assumed that the reaction of the aldehyde and the amino groups of the protein resulted in Schiff base formation. In the present study, the researchers examined further the interaction of aliphatic primary amines, such as amino acids and *n*-hexylamine, with malonaldehyde to produce *N,N'*-disubstituted 1-amino-3-iminopropenes and investigated their spectroscopic properties.

The aminoacids or their esters and α -hexylamine react with malonaldehyde to yield conjugated Schiff bases. These Schiff bases show characteristic absorption in the ultraviolet and visible regions of the spectrum. [7 figures, 2 tables, 25 references]

hydrocarbon content increases. (This denaturing power could be expected in view of the disorganization of the hydrophobic interior of this protein.) In contrast, branching of the hydrocarbon part of the denaturant, increasing the hydroxyl content, or blocking of the functional amino groups of the amides and the ureas by alkyl substitution reduces the denaturing power.

0.321

0.34

SULFHYDRYL CONTENT OF EXCISED CHICKEN BREAST MUSCLE DURING POSTMORTEM AGING

Caldwell, K. A., and Hans Lineweaver (U.S. Department of Agriculture, Research and Development Division, ARS, Albany, California 94710)
Journal of Food Science 34, No. 3, 290-291 (May-June 1969)

Koonz et al. (1954) and de Firmeyer et al. (1963) found that the muscle of broilers is more tender when rapidly cooked within a few minutes postmortem than when cooked at an intermediate time before aging is completed. Apparently, the muscle is tender initially, becomes tough, then becomes tender again. In view of previous studies (Whitaker, 1964) on changes in postmortem skeletal muscle, the authors postulated that postmortem changes in tenderness may be related to the sulphydryl-disulfide composition of the muscle. This research note reports on results of tests designed to determine whether sulphydryl groups are involved in these early postmortem changes.

There were no significant changes in total or nonprotein sulfhydryl concentrations in excised chicken breast muscle during the first 6 hr. postmortem (muscle was packed in plastic bags and aged in ice). Average concentration of sulfhydryl was 1.34 μ moles per mg. nitrogen for the total sulfhydryl content and 0.65 μ moles per mg. nitrogen for the nonprotein sulfhydryl content. Apparently there was no correlation between sulfhydryl concentration and rigor or tenderness of the chicken muscle. [1 figure, 10 references] [Abstracter: F. T. Piskur]

[8 figures, 7 tables, 33 references]

electrons at a point along the chain, normally reduced by NADPH, at the site of a nonhem iron complex.

0.35

0.5
(0.38, 2.03)

EXTRACELLULAR NUCLEASE ACTIVITY OF FISH SPOILAGE BACTERIA,
FISH PATHOGENS, AND RELATED SPECIES

Sadowski, A. Y., and R. E. Levin (Department of Food Science and Technology, University of Massachusetts, Amherst 01002)
Applied Microbiology 17, No. 6, 787-789 (June 1969)

The measure of the extent of nucleotide degradation in the tissue of fish has been proposed as an index of quality of fish. Recent studies considered the degradation of inosine monophosphate to hypoxanthine as an index of the length of time fish had been stored in ice. The autolytic reaction involved is: adenosine triphosphate → adenosine diphosphate → adenosine monophosphate → inosine monophosphate → hypoxanthine. Practically no data have been published on the ability of the predominant species of bacteria involved in fish spoilage to degrade polynucleotides.

The authors demonstrated the production of extracellular deoxyribonuclease and ribonuclease by 23 marine and 3 dairy strains of *Pseudomonas putrefaciens*, 15 strains of fluorescent pseudomonads pathogenic to fish, 38 strains of fluorescent pseudomonads that were isolated from haddock, and 34 related organisms. An agar-plate method was used. All strains of *P. putrefaciens* produced deoxyribonuclease and ribonuclease. Of the remaining 87 organisms, 23 produced ribonuclease and 13 produced deoxyribonuclease. The organisms that produced deoxyribonuclease also produced ribonuclease.
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UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

Abstracter: F. T. Piskur

0.5
IDENTIFICATION OF BACTERIA
BY RAPID SPECTROPHOTOFLOUROMETRIC METHODS

Rogers, Charles J., and Thomas C. Purcell (Consumer Protection and Environmental Health Service, Bureau of Solid Waste Management, U.S. Department of Health, Education, and Welfare, Public Health Service, 222 East Central Parkway, Cincinnati, Ohio 45202)
Environmental Science and Technology 2, No. 8, 764-766 (August 1969) (American Chemical Society, 1155 Sixteenth Street, N.W., Washington, D.C. 20036)

Additional characteristics of microorganisms are needed to facilitate their accurate classification and identification. Previous workers (Willcox and Shewan, 1963; Norris, 1964; Cam and Willcox, 1965) separated the esterases of bacteria by starch gel electrophoresis and used the characteristic enzyme patterns that were revealed to identify certain bacteria. In the present study the authors attempted to develop additional characteristics that might be used to identify bacteria. They determined the carbohydrate content and esterase activity, and calculated the esterase/carbohydrate (E/C) ratios of several species of bacteria. Such a technique might be used in the rapid identification of bacteria isolated from polluted waters.

Bacteria of the following species were examined: *Staphylococcus* 237, *S. hemolyticus*, *S. 227*, *Escherichia coli*, *Streptococcus faecalis*, *Strept. hemolyticus*,
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Abstracter: F. T. Piskur

0.5
(9.11)

ACTINOMYCETES IN NORTH SEA AND ATLANTIC OCEAN SEDIMENTS

Weyland, H. (Institut für Meeresforschung, Bremerhaven, Germany)
Nature 223, No. 5208, 858 (August 23, 1969)

In 1966, the author found few heterotrophic bacteria in samples of water taken from the Weser estuary and the German Bight; he found more in samples of bottom sediment that had been incubated for from 4 to 6 weeks at 18° C. Following up these results, he examined sediments collected at 107 stations in various parts of the North Sea and the English Channel. The findings are tabulated below.

Depth meters	Collection point of samples Characteristics	Location	No. actinomycetes found	
			Range	Mean
30-69	sand	English Channel	no./cm. ³ 92-1,485	no./cm. ³ 510
435-690	silt	Skagerrak	23-1,458	764
48-235	various	Central N. Sea	23-115	54
76-164	various	Northern N. Sea	23-230	128
Overall			23-2,909	

Similar results were obtained from an analysis of sediment samples taken at depths of from 25 to 3,362 m. off the coast of West Africa at distances up to 175 nautical miles. Although fewer colonies developed on pour plates for these
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Abstracter: L. Baldwin

0.5
INCIDENCE AND GROWTH OF SOME HEALTH-RELATED BACTERIA
IN COMMERCIAL FRESHWATER CRAYFISH (GENUS *PROCAMBARUS*)

Lovell, Richard T., and John A. Barkate (Department of Food Science and Technology, Louisiana State University, Baton Rouge 70803)
Journal of Food Science 34, No. 3, 268-271 (May-June 1969)

The commercial catch of fresh-water crayfish in 1965 in Louisiana was 8.6 million pounds. In 1966, the State of Louisiana licensed 34 crayfish processing plants. For many years crayfish were marketed alive, and the consumer boiled the crayfish before he ate them. Now, hand-peeled tail meat and precooked frozen crayfish products have appeared on the market. But, there is no information in the literature on the microbiology of crayfish as a food. The present paper reports on a study of the microbiology of the crayfish. The study had two objectives: (1) to determine the extent of occurrence of certain health-related bacteria in crayfish products from commercial sources and (2) to determine the patterns of growth of certain fecal indicator organisms and the patterns of growth and toxin production of pathogenic organisms in crayfish flesh and formula foods containing crayfish.

Fresh-water crayfish samples were collected from 22 sources representing the major commercial areas in Louisiana. The samples were analyzed for coliforms, *Escherichia coli*, fecal streptococci, coagulase-positive staphylococci, *Salmonella*, and *Clostridium botulinum* type E.

Coliform organisms, *E. coli*, fecal streptococci, coagulase-positive Staphylococci, *Salmonella*, and *C. botulinum* type E were found in 100, 92.6, 94.1, 3.0, lococci, *Salmonella*, and *C. botulinum* type E were found in 100, 92.6, 94.1, 3.0,
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Abstracter: F. T. Piskur

3.12 BACTERICIDAL POLYPHOSPHATES

British Patent 1,154,079
Stauffer Chemical Co. (U.S.A.) (pat.)
B.F.M.I.R.A. Abstracts 22, No. 8, 415, Abstract No. 1603 (August 1969)

Incorporating polyphosphates having chain lengths of between 16 and 34 phosphate groups into foods such as fruit juices, beer, refrigerated dough, wine, potatoes, animal feeds, eggs, fish, and poultry is said to reduce bacterial spoilage in the foods.
[Abstract: L. Baldwin]

[Abstract: F. T. Piskur]
The oxygen electrode is used to measure the respiration rate in biological suspensions. In this short note, the author presents a refinement of the cuvet described by Chappell (1961). This more refined cuvet shows low noise and back-diffusion of oxygen rates and, therefore, permits the measurement of respiratory rates of $2 \mu\text{M O}_2/\text{min}$. with better than 10 percent accuracy over a measuring time of 2 min. [3 figures, 5 references]
[Abstract: F. T. Piskur]

0.39 OXYGEN ELECTRODE CHAMBER FOR BIOLOGICAL SUSPENSIONS

Rikmenspoel, Robert (Department of Biological Sciences, State University of New York, Albany 12203)
Analytical Biochemistry 30, No. 2, 292-295 (August 1969)

The oxygen electrode is used to measure the respiration rate in biological suspensions. In this short note, the author presents a refinement of the cuvet described by Chappell (1961). This more refined cuvet shows low noise and back-diffusion of oxygen rates and, therefore, permits the measurement of respiratory rates of $2 \mu\text{M O}_2/\text{min}$. with better than 10 percent accuracy over a measuring time of 2 min. [3 figures, 5 references]
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[Abstract: F. T. Piskur]

0.5 ANTAGONISTIC EFFECT OF MONOVALENT CATIONS IN MAINTENANCE OF CELLULAR INTEGRITY OF A MARINE BACTERIUM

De Voe, Irving W., and Evelyn L. Oginsky (Department of Microbiology, University of Oregon Medical School, Portland 97201)
Journal of Bacteriology 98, No. 3, 1355-1367 (June 1969)

MacLeod (1965) found that gram-negative marine bacteria undergo lysis when transferred from sea water to low ionic environments. Harvey (1915) and other workers attributed this lysis to osmotic factors alone. Apparently, factors other than osmotic pressure contribute to the lytic phenomenon, inasmuch as studies have shown that lower concentrations of Na^+ and Li^+ are required to prevent lysis of marine bacteria and of an extreme halophile. During a series of experiments on lysis of a marine bacterium, the present authors noticed an antagonistic relation between monovalent and divalent cations in the maintenance of the integrity of the cell envelope of the organism. This paper reports on the susceptibility of the marine bacterium, designated isolate C-41, to lysis in distilled water and in salt solutions.

From the findings, the authors conclude that the lytic susceptibility of the marine bacterium is probably due to the competition between specific monovalent cations and Mg^{++} for electrostatic interactions with components of the cell envelope of the organism.
[16 figures, 3 tables, 26 references]
[Abstract: F. T. Piskur]

[Abstract: F. T. Piskur]
The oxygen electrode is used to measure the respiration rate in biological suspensions. In this short note, the author presents a refinement of the cuvet described by Chappell (1961). This more refined cuvet shows low noise and back-diffusion of oxygen rates and, therefore, permits the measurement of respiratory rates of $2 \mu\text{M O}_2/\text{min}$. with better than 10 percent accuracy over a measuring time of 2 min. [3 figures, 5 references]
[Abstract: F. T. Piskur]

0.30 PHYSICAL STUDIES OF LIPID-LIPID AND LIPID-PROTEIN INTERACTIONS

Chapman, Dennis (Unilever Research Laboratory, The Frythe, Welwyn, Hertfordshire, England)
Lipids 4, No. 4, 251-260 (July 1969)

This report is a review of studies conducted in the author's laboratory on lipid-lipid and lipid-protein interactions. He discusses studies of: (1) thermotropic mesomorphism of phospholipids and effects due to presence of water; (2) relevance of the thermal transitions to monolayer, bilayer, and membrane systems; (3) the interactions of phospholipids and cholesterol; and (4) lipid-protein interactions under various conditions, with special reference to serum lipoproteins and natural membranes. [6 figures, 46 references]
[Abstract: F. T. Piskur]

[Abstract: F. T. Piskur]
The oxygen electrode is used to measure the respiration rate in biological suspensions. In this short note, the author presents a refinement of the cuvet described by Chappell (1961). This more refined cuvet shows low noise and back-diffusion of oxygen rates and, therefore, permits the measurement of respiratory rates of $2 \mu\text{M O}_2/\text{min}$. with better than 10 percent accuracy over a measuring time of 2 min. [3 figures, 5 references]
[Abstract: F. T. Piskur]

0.6
(0.321)
PUTTING 'PETRO-PROTEIN' ON THE TABLE

Anonymous
Chemical Week 105, No. 5, 41-42, 44 (August 2, 1969)

A large number of oil and chemical companies and several research organizations in the United States, Britain, France, the Soviet Union, Japan, Taiwan, India, Czechoslovakia, and Switzerland are working on processes for making nutritious, low-cost single-cell protein (SCP) from natural gas and petroleum. The big reason for such extensive research and development activity is the tremendous market potential for more and better protein foods. According to the Food and Agriculture Organization, food production must be tripled by the year 2000--but the supply of protein must be increased at least 40-fold. Because just 2 percent of the world's output of crude petroleum is enough to make from 25 to 30 million tons of petro-proteins, enough to fill the protein requirements of nearly 2 billion people for 1 year, specialists in food production believe that proteins from oil or natural gas have the potential to attain the FAO objective.

Synthesizing proteins from hydrocarbons is comparatively simple. A broth containing ammonia, phosphate, dextrose, and other nutrients is inoculated with either a single-cell yeast or a bacterium that will multiply rapidly on paraffin. The culture medium and the paraffin feedstock are fermented in the presence of a continuous mixture of compressed air. The microorganism devours the straight-chain hydrocarbons, and its enzymes form an amino acid by inserting an amino radical in the alpha position of the carboxyl group oxidized from the terminal carbon.

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Abstracter: L. Baldwin

0.7
(0.36)
METABOLIC DERANGEMENT IN RESPONSE OF RATS TO INGESTION
OF IMBALANCED AMINO ACID MIXTURES

Soliman, Abdel-Gawad M., and Kendall W. King (Department of Biochemistry and Nutrition, Virginia Polytechnic Institute, Blacksburg, Va.)
Journal of Nutrition 98, No. 3, 255-270 (July 1969)

The term "amino acid imbalance" describes the dietary amino-acid patterns which result in depressed food intake and retarded growth in animals. These effects can be alleviated by adding small amounts of the most limiting indispensable amino acids to the diet. The purpose of the present very short-term study was to determine the metabolic bases for the gross effects of amino-acid imbalance and to evaluate the efficiency of utilization of the limiting and nonlimiting indispensable amino acids.

The results confirm the hypothesis advanced by Harper and coworkers (1964) that ingestion of unbalanced amino-acid mixtures results in severe depression in the levels of the limiting amino acid in plasma and tissue fluids. Also, the tests show that the retention efficiency and the efficiency of utilization of the limiting amino acid are elevated, and that synthesis of protein is enhanced as a result of ingestion of unbalanced amino-acid mixtures. The data further show that the retention efficiency and efficiency of utilization of the nonlimiting indispensable amino acids are lowered despite an increase in their net retention. Because these metabolic derangements occur while the food is still being absorbed from the intestinal lumen, apparently the disorders are the initial effects, and

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Abstracter: F. T. Piskur

0.7
(9.19)
DDT EFFECT ON RATS RAISED ON ALPHA-PROTEIN RATIONS:
GROWTH AND STORAGE OF LIVER VITAMIN A

Tinsley, Ian J. (Department of Agricultural Chemistry, Oregon State University, Corvallis)
Journal of Nutrition 98, No. 3, 319-324 (July 1969)

The evaluation of the possible toxicological hazard of a long-term, low-level exposure to a chemical, such as a pesticide, taking all variables into account, is difficult. The present author decided to explore one little-noticed variable, the possible interaction between nutritional status and toxic stress, as a measure of the toxicological hazard. They explored the possible interaction between the nutritional stress caused by a diet of poor-quality protein (α -protein of soy beans) and the toxicological stress caused by exposure to DDT. The α -protein of soy beans is deficient in the sulfur-containing amino acids, particularly methionine. The researchers fed rats α -protein rations supplemented with varying levels of methionine and noted the effect of DDT on the growth of the animals and the vitamin A level in the liver of the animals.

When the level of methionine supplement was increased (in increments of from 0 to 4 g./kg.), the growth of male rats increased. Maximum growth of female rats occurred when the level of methionine was at 1.0 g./kg. DDT suppressed growth of the rats when the diet was not supplemented with methionine, but when DDT was used at a level of 1.0 g./kg., the chemical stimulated growth of the rats. The

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UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

Abstracter: F. T. Piskur

1.85
(1.0116, 2.12)
EXPLORATIONS FOR CALICO SCALLOP, PECTEN GIBBUS,
IN THE AREA OFF CAPE KENNEDY, FLORIDA, 1960-66

Drummond, Shelby B. (Exploratory Fishing and Gear Research Base, Bureau of Commercial Fisheries, P.O. Box 1207, Pascagoula, Mississippi 39567)
Fishery Industrial Research 5, No. 2, 85-101 (July 1969)

Introduction.--In June 1960, following reports by Florida fishermen of scallops being caught in shrimp trawls, the Bureau of Commercial Fisheries used the Silver Bay, an exploratory fishing vessel equipped with commercial scalloping gear, to explore the waters off the central east coast of Florida. During these explorations in 1960-66, the Bureau found an immense bed of calico scallops extending more than 100 miles north and about 100 miles south of Cape Kennedy, Florida. Despite the interest of the industry in this enormous 200-mile-long bed, the resource has remained largely unused, owing to the high cost of shucking calico scallops by hand.

The Cape Kennedy scallop grounds cover some 5,760 square miles and extend from about 11 miles south of Stuart, Florida, to about 6 miles north of St. Augustine.... They lie at depths of from 5 to 40 fathoms. Relatively smooth bottom, which is composed mostly of sand and dead shell, makes the grounds ideal for dredging or for trawling with reinforced gear.

Recently, a fishery for calico scallops has developed in North Carolina on small but productive beds relatively near the Cape Kennedy grounds, and problems

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Reprinted in part

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<p>2.1121 NEW STYLES IN TRAWLING</p> <p>Anonymous Sea Harvest & Ocean Science, pp. 14-15 (August-September 1969) (National Business Publications, Ltd., Gardenvale 800, Quebec, Canada)</p> <p>The wing (or vinge) trawl recently put into use by a few New England draggers is very effective for catching bottomfish and herring. Economically, it has advantages for a small dragger that conventional nets do not have--it can be used to fish for herring as well as all demersal species without the expense of extra gear or changes in the vessel's layout; it can be adjusted to fish on bottom so rough that bobbins would normally be necessary; it will catch up to 20 tons of fish in a single short tow; and it will catch them even when they are much too scattered to be taken by purse seine.</p> <p>The wing trawl differs in several ways from conventional trawls. It is made of extremely fine twine (usually No. 9 or 12X terylene). Instead of heavy ground cables, it has two or three light bridles, each over 100 ft. long, fitted to each wing. The wings and mouth of the net are made of large-meshed webbing, as large as 8 in. stretched-mesh size. Only the tightness of the webbing prevents the fish from escaping, for the net is not just hung tight--it is hung to an inverse ratio (that is, the percentage of slack is put into the rope, not the webbing; thus the headline and footrope are longer than the stretched length of the webbing). The amount of slack in the lower wing, if there is any slack, may be as small as one-half mesh. The top sheets of the bag are one-half or one mesh shorter than their lower counterparts; this difference is not determined by a mesh count--to allow (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 12 PAGE 7 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: L. Baldwin</p>	<p>2.115 (2.118) DESIGN FOR A CONTAINER TRAWLER -- A GERMAN SUGGESTION</p> <p>Anonymous Fishing News No. 2932, 8 (August 15, 1969)</p> <p>According to Heino Ritter, author of "The Use of Containers on Fishing Vessels," operating large freezer/factory trawlers has been less successful than had been hoped. One of the reasons lies in the failure of the auctioning system to provide adequate returns for owners and crew.</p> <p>The refrigerated container could help solve the problem. These containers, each equipped with its own freezing unit, could be stored until the market becomes favorable; or the fish in them could be released to the market in a sequence that would promote a stable price structure and avert the need to consign good quality fish to the fishmeal factory. Three methods of operating with containers are suggested. (1) The ship precools the containers on the outward voyage, stows the frozen fish in them, and at the end of fishing, brings them to her home port and exchanges the loaded containers for empty ones. With this method, two sets of containers are required. (2) The ship unloads her filled containers at some port more accessible to the fishing grounds than the home port is and takes on a fresh supply of empty containers there. With this method, either two or three sets of containers are needed. (3) The ship discharges her filled containers on board a mother ship/transport ship and receives empties in return. With this method, three sets of containers are needed. (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 12 PAGE 7 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: L. Baldwin</p>
<p>2.1121 THE GERMAN ONE-BOAT MID-WATER TRAWL -- DEVELOPMENT FROM 1959-1968</p> <p>Schärfe, J. Fishing News International 8, No. 7, 26-28, 30, 33 (July 1969)</p> <p>Background.--The midwater trawl used by the West Germans before 1960 was reasonably efficient for catching nonactive fish--such as spawning herring or cod--but was not satisfactory for less concentrated, more active fish. In search of a remedy for this situation, the Institut für Fangtechnik of the Bundesforschungsanstalt für Fischerei, Hamburg, modified the one-boat midwater trawl. These modifications included changing the two-panel nets to four-panel nets with "rectangular" cross sections and using much larger other boards, longer bridles, and heavier front weights. Thus the net opening was appreciably increased, and the unfavorable influences from the trawler and the warps were decreased. Commercial tests of the gear have established its efficiency not only for herring but for cod and roundfish. Moreover, German trawlers are no longer confining their activities to the North Sea; they now fish off Iceland, New England, and the west coast of Britain more actively than they do in traditional North Sea waters.</p> <p>Description.--The present article is the first of six giving a detailed account of the development and operation of the German one-boat midwater trawl, this decade's most important contribution to the advance of fish-catching techniques, according to the editor of <u>Fishing News International</u>. The original (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 12 PAGE 7 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: L. Baldwin</p>	<p>2.115 (2.1471) SWITCH FISHING MAY LEAD TO CHANGES IN STERN TRAWLER DESIGN</p> <p>Brady, Peter Fishing News International 8, No. 7, 46 (July 1969)</p> <p>Problem.--As electronic fish-detection systems become more sophisticated and fishermen become more experienced in their use, situations increasingly arise in which fish in shoals that have been pinpointed cannot be caught--either the shoal is on the bottom when the fisherman's midwater gear is rigged or it is in midwater when his bottom gear is rigged. Thus he needs more versatile gear or two sets of gear ready for immediate use, neither of which is a commonly used expedient because of the different types of trawl doors required and because of the amount of room available on the deck of present-day trawlers. In the past, investigators have experimented with two-deck trawls, either one deck above the other or two decks side by side. Although the U.S.R.'s catamaran trawler Experiment features the side-by-side configuration, it is not very feasible for a standard stern trawler because of the limited beam.</p> <p>Solution.--Now several countries are offering new stern trawlers designed to operate with two sets of gear. East Germany and Poland offer such vessels. Both midwater and bottom trawls are on deck ready for shooting, a capability made possible by a change in the layout of the deck. The trawl winch is incorporated as two separate units and is located toward the stern between the inner and outer (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 12 PAGE 7 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: L. Baldwin</p>

version of Dr. Schärfe's account was published in Information für die Fischwirtschaft 15, Nos. 3-4, 104-172, in German. An English translation is available for \$3 from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151. The 65-page typescript translation has the identifying designation "111-89-50211." [1 figure, 5 photographs]

[Abstracter: L. Baldwin]

Although this article is directed basically toward a description of the applicability over the years, of the one-boat midwater trawl for harvesting a variety of commercial species of fish, it contains a detailed analysis of the reaction of various fishes to the trawl. For example, spawning and nonspawning herring, whether in the Skagerrak-Begersund area or on Georges Bank, react entirely differently to the approaching net. Schools that appear on the echograms as poles cannot be fished with the same techniques as those that appear as clouds or as layers. The commercial potential of such species as coalfish (*Gadus virens*) and blue whiting (*Micromesistius poulassou*) is mentioned in terms of the fishing procedures required to catch them.

Schärfe, J. (Gear Technology Section, Department of Fisheries, FAO, Rome, Italy) Fishing News International 8, No. 8, 18-20, 22 (August 1969)

2.1121 THE GERMAN ONE-BOAT MID-WATER TRAWL. PART 2. FISHING CONDITIONS FOR THE HERRING AND OTHER SPECIES

for slight discrepancies in mesh sizes, each sheet is stretched out and measured against its counterpart. The net is fished best at a narrow angle of attack, a condition achieved by finely angling the boards and much longer cable between the boards.

Despite its fishing and economic advantages, the wing trawl must be precisely constructed and used with care. Warp length, cable length, and proportional length of upper and lower bridles must be precisely adjusted (for example, the difference of a few inches in the bridles will raise or lower the net significantly), as both setting and towing speed must be. [MODERN FISHING GEAR OF THE WORLD, Hilmar Kristjonsson (ed.), pages 357-358 (1959), gives construction details and results of fishing trials made with a Danish vine trawl on Black Sea anchovy.]

The beam trawl is especially suited to fishing on bottoms where large vessels cannot fish. Its use for shrimp, for catching flatfish and other species living close to the seabed, and for one-man fishing among weeds and grass is regaining favor. With the beam trawl, the fisherman does not have to worry about whether the doors and the trawl mouth are opening correctly or whether the ground-rope is digging in or not. The trawl opening remains fixed and is not affected by the length of the warp, alteration of course, correct opening of the doors, or changes in the tide. On suitable bottoms, tickler chains can be fastened between the shoes without affecting the width of the trawl. Beam trawl nets and other trawl nets can be converted interchangeably with ease. Most small beam trawls can be hauled on a single warp by the trap-hauling device used on most small boats. [2 figures]

bulwarks. The trawl warps and the entire trawl deck are forward of the winch position, right up between the port and starboard superstructure, aft of the deckhouse. Two sweep-line winches are mounted side by side on the boat deck; each takes the cables from a different trawl.

The British are working on a design in which two net drums at the fore end of the trawl deck will be used to take in both the cables and the net. No practical trials of this trawler configuration have been made yet. However, tests with a full-sized net drum aboard a side trawler have shown that net drums can be used successfully with the heaviest deep-sea bottom gear; the Dutch have used them aboard stern trawlers for midwater gear. Thus, the author suggests, the installation of two net drums may be the best answer now available to the problem.

Implications.---Incorporating these ideas may well change the basic design of the stern trawler, especially the design of smaller vessels and those with aft-mounted engine rooms. The Japanese have already built small stern trawlers with split trawl-warp winches mounted aft and a net drum mounted just forward of amidships. It is highly probable that they will also adapt the design to larger vessels.

Although the second and third methods of operating make it possible for relatively small vessels to operate on the most distant fishing grounds, the capital required would necessitate the cooperation of an economically substantial processing and distributing organization, or the financial resources of a large company or group. Moreover, the modification of present vessels to operate as container trawlers, Ritter says, is impossible. Altering hatches, installing the necessary stowing and loading gear, and disturbing existing fishing and factory facilities make such modification impractical from the start.

The ship must be expressly designed for container trawling. In Ritter's article, the details of construction and the gear and equipment are precisely defined. The ship is a stern freezer-trawler, 58 m. long and 12 m. wide. She carries a crew of 19, with 2 reserves. Her bunker capacity is adequate for from 16 to 18 days of fishing plus the outward and homeward voyages; cruising speed is 13 knots. Her twelve 20-ft. containers will hold 158 metric tons of frozen fish; since they are insulated, no further insulation is required in the fish hold. Her six-drum main winch has a pull of 14 tons at a heaving speed of 120 m. per minute. Her own lifting gear is capable of loading and unloading the containers, each of which has a gross weight of 20 tons.

Construction costs for building such a ship are not expected to run more than 10 percent over those of a conventional freezer-trawler; however, the price of three sets of containers must be added to the final cost. [1 figure]

<p>2.118 (1.0144, 1.01111)</p> <p>ECONOMIC RETURNS TO POLISH FACTORY TRAWLERS IN NORTHWEST ATLANTIC</p> <p>Noetzel, Bruno G. (Division of Economic Research, U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, 7338 Baltimore Avenue, College Park, Maryland 20740)</p> <p>Commercial Fisheries Review <u>31</u>, No. 6, 56-61 (June 1969) (Separate No. 842)</p> <p>Background.--The Northwest Atlantic has the world's richest resources of food fish; it is also the most exploited part of the ocean. Fishing effort increases year after year. The pressure has accelerated with introduction of new fishing techniques--and transfer of fish-processing activities from land to fishing grounds via factory ships.</p> <p>Large fleets of modern stern-ramp trawlers operate year round. The vessels are equipped with highly mechanized fish-processing facilities: freezing, fish meal, and fish oil plants, and refrigerated holds for frozen products. They are capable of converting the entire catch into final marketable products: frozen fillets in blocks, fish meal, and fish oil.</p> <p>These huge fishing and processing vessels, built entirely with state funds, are representative of the direction of fishery development in most of the Eastern European countries in the past 10 years.</p> <p>Operation.--On Oct. 22, 1960, the Gdansk Shipyard delivered the first in a series of these modern fishing vessels to Poland's state-owned fishing industry.</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 12 PAGE 9 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Reprinted in part</p>	<p>2.12 (2.06, 6.9)</p> <p>UNDER-EXPLOITED GROUND FISH ON THE NOVA SCOTIA BANKS</p> <p>Scott, J. S. (Fisheries Research Board of Canada Biological Station, St. Andrews, New Brunswick)</p> <p>Fisheries of Canada <u>22</u>, No. 2, 13-15 (August 1969)</p> <p>Present Canadian fisheries are based on the intensive fishing of only a few species--cod, haddock, redfish, herring, flatfish, and a few other species. Most of these fish stocks are being very heavily exploited, and some (such as haddock) are being overfished. In search of a solution to the problem, the Fisheries Research Board of Canada has recorded the numbers of groundfish of every species that have been caught on the Nova Scotia Banks over the past 10 years during research cruises. Depths of from 30 to 250 fathoms have been fished by otter trawl during all seasons of the year. From the numbers recorded, the researchers can get an indication of the species that may be worth investigating further, either for direct consumption or for conversion to fish protein concentrate (FPC) or fish meal.</p> <p>The table on the back shows the main species caught, ordered by weight per 100 hours of fishing. Although the top of the list is composed mainly of commercial species, Argentine (<i>Argentina silus</i>) and silver hake (<i>Merluccius bilinearis</i>) do not appear in Canadian landing statistics. Specific efforts to catch these species, and haddock, may have distorted their catch rates; however, landings by the U.S.S.R. on these banks (15,000 tons of Argentine in 1966 and 123,000 tons of silver hake in 1963) seem to confirm their potential.</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 12 PAGE 9 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: L. Baldwin</p>
<p>2.119 (2.1471)</p> <p>HOLLAND-MARTIN REPORT ON TRAWLER SAFETY (CMND. 4114)</p> <p>Holland-Martin, Sir Deric (comm. chrm.)</p> <p>Distributed from HM Stationery Office, 49, High Holborn, London, WCI, England.</p> <p>114 + 40 pp. (July 1969) Price 14s 6d</p> <p>Fishing News No. 2930, 1, 3-5 (August 1, 1969)</p> <p>After more than a year of investigation into the way British deep-sea trawlers are built, equipped, manned, and managed, the Committee of Inquiry into Trawler Safety, under the chairmanship of Admiral Sir Deric Holland-Martin, has published its final report. Representatives of the British Trawlers Federation, the owners, and the White Fish Authority have been heartened by the scope of the report--it goes beyond the mere safety of trawlers and examines the basic structure of the fishing industry in relation to safety. The President of the Board of Trade has already announced that the Government accepts in principle the 83 recommendations contained. Of particular note throughout is the committee's evident awareness both of the economic difficulties of the deep-sea trawler industry and of the fact that many of its recommendations could, in the short run, add to them.</p> <p>Among the specifics examined and recommended to be changed are the system of recruiting and training officers and men, policies governing rest aboard ship and leave on shore, work schedules, size of supernumerary crew, certification requirements, the role of management in the maintenance of safety, the relation of shore-based management and the skipper, promotion practices, salary and wage arrangements, clothing allowances, shipboard communication equipment, and criteria for</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 12 PAGE 9 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: L. Baldwin</p>	<p>2.1471</p> <p>BEAM TRAWLING A PROFITABLE OPERATION</p> <p>McCallum, I. D. (Fisheries Research Division, Marine Department, Wellington, New Zealand)</p> <p>Commercial Fishing <u>8</u>, No. 6, 10-11, 13, 15 (June 1969)</p> <p>In 1959, two Belgian shrimp boats were converted from otter trawls to two-beam trawls. The result was so successful that many Dutch trawlers did likewise. Now vessels from both countries are fishing two beam trawls simultaneously, not only for shrimp but for flat fish, cod, and whiting. The grounds normally fished have mud, sand, or shingle bottoms, and the fishing is done in waters 5 to 40 fathoms deep. This article describes, with line drawings, the gear used, the method of operation, and the advantages and disadvantages of the system.</p> <p>The main advantages of beam trawling, relative to otter trawling, are as follows. The length of warp paid out for a given depth of water is less critical, for the drag of the warp has less effect on the action of a beam trawl than it does on an otter trawl. The track fished by two beam trawls is as much as 20 percent wider than that of an otter trawl equipped with tickler chains. Course alterations do not change the opening of the net. Cross tides do not affect beam trawls as much as they do otter trawls. A beam trawl does not have to lie with its beam to wind and sea during hauling and shooting, as a side trawler does. The foot rope does not dig into soft mud and bog down as much as that of an otter trawl tends to do. Operating two trawls simultaneously, the fisherman has a means of comparing the effectiveness of two different gear configurations--and making</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 12 PAGE 9 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: L. Baldwin</p>

3.4 HANDLING SMOKED FISH -- RECOMMENDED PRACTICE FOR RETAILERS

Anonymous
Commercial Fishing 8, No. 4, 13, 15 (April 1969)

Since the preservative effect of smoking is negligible (present-day commercial smoking is largely done to enhance flavor and odor, not to preserve the product), the shelf life of smoked fish is only slightly longer than that of the fresh fish from which the smoked product was made. To help retailers ensure that smoked fish products reach the customer in first-class condition, this article (a reprint of Torry Advisory Note No. 14) provided guidelines for inspecting newly delivered smoked fish products and for handling the products during the period between their delivery at the store and their sale.

Upon delivery, the fish should be examined physically. Their surface should be bright and glossy, showing no traces of salt crystals or of smut, dirt, or processing residue. The flesh should be firm and springy to the touch, showing no extensive gaping and no discoloration; the skin should not slip too easily from the flesh. The smell, though somewhat masked by smoke processing, should not be objectionable.

After acceptance, most of the fish should be stored in a chill room--only small quantities being laid out for display. At intervals, samples of the fish should be cooked and tasted to ensure that they have developed no off-flavors or odors.

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Abstracter: L. Baldwin

4.5 INACTIVATION OF RIBONUCLEASE AND OTHER ENZYMES BY PEROXIDIZING LIPIDS AND BY MALONALDEHYDE

Chio, K. S., and A. L. Tappel
Biochemistry 8, No. 7, 2827-2832 (July 1969)

Barber and Bernheim (1967) considered lipid peroxidation to be a damaging reaction in biological systems. The oxidation of polyunsaturated fatty acids is considered a mechanism of disruption of biological membranes. The present paper reports on a study of the types of interactions that take place between oxidized lipid products and enzymes. The authors describe (1) the mechanism of the reactions between (bovine pancreatic) ribonuclease A and polyunsaturated lipids, and between ribonuclease A and malonaldehyde to give yellow, fluorescent products, and (2) the nature of the cross-linkage of polymerized ribonuclease A.

Sulphydryl enzymes are most susceptible to inactivation by intermediate products of peroxidation of lipids. The oxidation products of polyunsaturated lipids also inactivate nonsulphydryl enzymes, such as ribonuclease A. A fluorescence in the enzyme-lipid reaction mixtures accompanies the loss of ribonuclease A activity. The inactivated ribonuclease A shows fluorescent monomer, dimer, and higher molecular weight species in the Sephadex G-100 fractionation pattern.

Ribonuclease A that is inactivated by malonaldehyde, shows fluorescence and a gel filtration pattern similar to that of the ribonuclease A inactivated by peroxidizing polyunsaturated lipids. The authors postulate that malonaldehyde

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Abstracter: F. T. Piskur

6.19 EFFECT OF INTRAMUSCULAR INJECTION OF PENICILLIN ON BACTERIAL SPOILAGE

Vadehra, D. V., R. C. Baker, and H. B. Naylor (Department of Poultry Science, Cornell University, Ithaca, New York 14850)
Poultry Science 48, No. 3, 1120-1121 (May 1969)

Hake meal was used in broiler rations to determine its value as a feed supplement. Its value was compared with that of herring meal.

Twenty-four-day-old broilers were fed rations containing varying amounts of hake meal, herring meal, or combinations of both. The fish meals replaced an equivalent amount of soybean meal protein with necessary adjustments in the levels of calcium and phosphorus. The feeding test was carried out over an 8-week period.

Broilers fed 5 percent hake meal showed a significant decrease in feed consumption, and feed conversion was significantly improved over the soybean meal control ration. Similar improved feed conversions were noted when broilers were fed 5 percent herring meal or a combination of 2.5 percent herring meal and 2.5 percent hake meal. Further improvement in feed conversion was noted when the broilers were fed a combination of 5 percent hake meal plus 5 percent herring meal.

Up to 7.5 percent hake meal can replace a equivalent amount of soybean meal protein in broiler rations (broilers fed this ration show a marked reduction in

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Abstracter: F. T. Piskur

6.190 SUMMARY AND REPORT ON RECENT DEVELOPMENTS IN POULTRY NUTRITION. A REVIEW OF PAPERS PRESENTED AT THE 1969 POULTRY SCIENCE ASSN. MEETING - PART 1

Couch, J. R. (Texas A. & M. University, College Station, Texas)
Feedstuffs 41, No. 37, 21, 24 (September 13, 1969)

Included in the 100-odd papers presented at the 1969 meeting of the Poultry Science Association held at Ft. Collins, Colorado, were those reviewed below.

A group from North Carolina State University compared the nutritive value and the cost of diets containing fish meals produced by the "conventional" method and by the heat-transfer method. In diets containing only 15 percent protein and composed primarily of corn and fish meal, the heat-transfer method gave a significantly better feed conversion; however, in a practical type diet, the difference in the meals was not significant. The author concludes that fish meal processed by the conventional method is satisfactory.

The group from Kansas State University that has been active in catfish nutrition over the past few years reported that the chick growth factor, the amino-acid composition, and the feed conversion of processed catfish offal (a dried catfish scrap product) is equal to that of marine fish meal. The author says that he knows of no other instance of the processing and evaluation of catfish offal.

A research group from the University of Arkansas used broiler breeders to demonstrate the effect of the "fish factor" on hatchability--the effect carries over from the breeder through the egg to the chick. The author notes that such findings have been previously reported.

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Abstracter: L. Baldwin

AIR POLLUTION FROM ANIMAL WASTES DETERMINATION OF MALODORS BY GAS CHROMATOGRAPHIC AND ORGANOLEPTIC TECHNIQUES

Burnett, William E. (Department of Food Science, Cornell University, Ithaca, New York 14850)

Environmental Science and Technology 3, No. 8, 744-749 (August 1969)

This paper reports on the identification of the volatile compounds responsible for the malodor of accumulated liquid poultry manure. The sulfur compounds, organic acids, and skatole were the more important components involved in air pollution. The author suggests that the best way to control air pollution from animal wastes is to prevent the formation of the malodorous substances. For control of odors from poultry wastes, the author suggests in-house drying of the material or collection of the material in a mixture of cold water and phosphoric acid. [6 figures, 2 tables, 21 references] [abstract: F. T. Piskur]

[Abstracter: F. T. Pliskur]

feed consumption). When 5 or 7.5 percent herring meal is used to replace an equivalent amount of soybean meal protein in broiler rations, the broilers gained more weight and showed improved feed conversion over those fed the soybean meal control rations. When broilers were fed the combination of 2.5 percent of hake meal and 2.5 percent herring meal as a supplement, they showed improved feed conversion over those fed the control ration; feed conversion improved further when 5 percent each of hake meal and herring meal was used.

[2 tables, 3 references]

THE SPANISH SEAWEED INDUSTRY

(1.0148)
Durrant, Norman W. (Bureau of Commercial Fisheries, U.S. Fish and Wildlife Service, Washington, D.C. 20240)
Commercial Fisheries Review 31, Nos. 8-9, 60-61 (August-September 1969)

The seaweed industry, principally the manufacture of agar-agar, began in 1940 when the lack of Japanese supplies induced Spanish bacteriologists to try to obtain this product from Spanish seaweeds. Small-scale investigations were started and imitated Japanese techniques.

Spain is the second largest producer of agar-agar in the world, exceeded only by Japan. However, the domestic use of agar-agar in Spain is not significant. Therefore, 85 to 90 percent of the agar-agar produced is exported to the U.S., England, Germany, Czechoslovakia, USSR, Italy, and Poland. Spain is the largest exporter of agar-agar in the world.

The primary problem the seaweed industry now faces is obtaining enough raw material to keep the plants in operation. The total capacity of all plants is now 1,800-2,000 tons annually; actual production was 890 tons in 1965, 600 tons in 1966, and 925 tons in 1967. This means that Spanish agar-agar plants have been operating at only about 42 percent of total capacity. [Reprinted in part]

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Scientists from the nutrition research laboratory of Borden, Inc., hypothesized that taurine is one of the elusive unidentified growth factors (UGF). They found that a fermentation factor, which occurs in Fermacto-500, is required along with taurine for maximum growth. Fish meal and poultry byproduct meal were found to be good sources of taurine; meat and bone meals were not. The author notes that an earlier report from West Virginia University stated that taurine possesses growth-promoting activity when included in chick diets. He also notes that practical feed formulations still contain sources of UGF.

6.190

Fish product	Condition and shelf life of product stored			
	at 60° F.		at 32° F.	
	prime	edible days	prime	edible days
Cold smoked -				
Cod: individual fillets	2-3	4-6	4-6	8-10
Haddock: individual fillets	2-3	4-6	4-6	8-10
block fillets	1-2	2.5-3	4	6
finnans	2-3	4-6	4-6	10-14
pales	1-2	2.5-3	4	6-7
Herring: kippers & kippered				
fillets	1-2	3	3	3-4
wrapped	2-3	5-6	4-6	10-14
unwrapped	1-2	2-3	3-4	5-6
bloaters	2-3	4-5	4	10
Salmon: fillets				
Hot smoked -				
Haddock: smokies	1-2	2.5-3	3-4	5-6
Herring: bucklings	1-2	2-3	3-4	5-6
Trout: whole gutted	3	7	6	10

Fish kept at 32° F. will keep in first-class condition 3 or 4 days longer than fish kept at room temperature; they will remain edible for as much as a week longer. The length of time several kinds of smoked product will remain in each of these conditions is tabulated below.

4.2 FREE FATTY ACIDS OF HERRING OILS: POSSIBLE DERIVATION FROM BOTH PHOSPHOLIPIDS AND TRIGLYCERIDES IN FRESH HERRING

Addison, R. F., R. G. Ackman, and J. Hingley (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)
Journal of the Fisheries Research Board of Canada 26, No. 6, 1577-1583 (June 1969)

The free fatty acid (FFA) level of herring oil is often one of the factors governing the price of the oil to the refiner. Occasionally, herring oils with low levels of FFA develop unexpectedly high levels of FFA during prolonged storage or during shipment. As part of a broad study to determine the factors governing FFA levels in fish oils, the authors examined the composition of FFA from nine herring oils commercially produced during the summer of 1968.

The FFA's of the nine commercially produced herring oils were produced mainly through hydrolysis of the flesh phospholipids and, to lesser extent, through the hydrolysis of the triglycerides. This hydrolysis probably occurs before or during production of the oils. The authors suggest that in some instances FFA may be formed by slow chemical hydrolysis of phospholipids after oil production. [Abstract: F. T. Fiskur] [2 tables, 13 references]

[Abstracter: F. T. Piskur]

is probably the agent responsible for the intra- and intermolecular cross-linking of ribonuclease A. The ribonuclease A-polyunsaturated lipid product is markedly similar to age pigments. The ribonuclease A-polyunsaturated lipid product and cardiac age pigments, which are a protein-lipid complex, are markedly similar—particularly in their fluorescent characteristics. [5 figures, 2 tables, 42 references]

4.

<p>6.190 (6.82)</p> <p>SUMMARY AND REPORT ON RECENT DEVELOPMENTS IN POULTRY NUTRITION. A REVIEW OF PAPERS PRESENTED AT THE 1969 POULTRY SCIENCE ASSN. MEETING - PART 2</p> <p>Couch, J. R. Feedstuffs <u>41</u>, No. 38, 20, 22, 43-44 (September 20, 1969)</p> <p>A group from Washington State University compared Pacific Ocean hake meal and British Columbia herring meal at levels of 5 and 10 percent in starter and laying diets and at 5.0 and 7.5 percent in pullet developer diets. The two meals were equally satisfactory for growing pullets. Although the laying-house performance of pullets fed the laying diets was satisfactory, the flavor of the fresh eggs was objectionable, eggs from hens fed the hake meal being the more so. In an additional study, these two meals, Norwegian herring meal, and Peruvian anchovy meal were tested for various effects on poultry. All produced satisfactory growth, sexual maturity, and liveability. A soybean-and-10-percent-anchovy-meal diet gave the lowest egg production and hatchability. The overall flavor of eggs from hens fed the soybean diets was the most acceptable; that of eggs from hens fed the hake meal was the least.</p>	<p>6.51 (6.55, 9.14)</p> <p>ALABAMA'S RICO LIQUIDS CONTINUE EXPANSION INTO LIQUID FEED FIELDS</p> <p>Brown, Robert H. Feedstuffs <u>41</u>, No. 37, 40-41 (September 13, 1969)</p> <p>Although liquid feeding was used in England as far back as 200 years ago, it never actually was successful. But with the cooperation of scientists and nutritionists on liquid feed supplements, with the decreasing availability of grain for use in animal feeds (10 years ago, only 10 percent of the corn crop went for industrial use and human consumption; today, 40 percent goes for those purposes), and with the increasing demand for meats, the market for liquid supplements is growing.</p> <p>The latest product developed by Rico Liquids, a relative newcomer to the field, is a fermented tuna broth fortified with vitamins and minerals and homogenized into a catfish feed. The resulting broth is mixed with ground limestone or oyster shells, which provide calcium for flotation. The feed is thrown into the pond with a scoop. It remains on top of the water rather than settling below the surface as most conventional feeds do; thus it is more attractive to the fish, and it gives the grower better control of his feeding costs. Field trials have shown that top feeding results in less loss of young fry, elimination of guess work as to whether the feed has been eaten, lower mortality rates among the fish, and a higher yield.</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 12 PAGE 13 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: L. Baldwin</p>
<p>6.37</p> <p>GREEN ALGAE, CHLORELLA, AS A CONTRIBUTOR TO THE FOOD SUPPLY OF MAN</p> <p>Durrant, Norman W. (Branch of Technology, Bureau of Commercial Fisheries, U.S. Department of the Interior, Washington, D.C. 20240), and Carol Jolly (RD No. 2, Salem, New York 12865) Fishery Industrial Research <u>5</u>, No. 2, 67-83 (July 1969)</p> <p>Some 17,000 known species of algae inhabit the fresh and marine waters of the world. Of these 17,000, only a few have been carefully investigated to determine their value as a human food resource. Those few that are of known commercial value are used worldwide in many forms and in many types of products. These include uses in such products as fertilizers, animal foods, human foods, and incorporation into pharmaceuticals and cosmetics.</p> <p>One of the more promising algae having potential as a continuing human food resource is the unicellular green algae, <i>Chlorella</i>. This alga has several characteristics that contribute to its potential value. These include (1) rapid growth rate, (2) variability of composition as a result of varying the environment, which can be controlled, and (3) ability to reproduce and grow in a closed system.</p> <p>Accordingly, this report centers largely on green algae (<i>Chlorella</i> in particular) and discusses both their artificial production and nutritional value.</p> <p>Action and findings.--Animal and human feeding studies have been made to determine the nutritive properties of <i>Chlorella</i>. Though several of the tests were</p>	<p>6.54 (1.88)</p> <p>MUSSELS: A POTENTIAL SOURCE OF HIGH-QUALITY PROTEIN</p> <p>Joyner, T., and John Spinelli (Biological Laboratory; Technological Laboratory, Bureau of Commercial Fisheries, 2725 Montlake Blvd. East, Seattle, Washington 98102) Commercial Fisheries Review <u>31</u>, Nos. 8-9, 31-35 (August-September 1969)</p> <p>The Bureau of Commercial Fisheries has undertaken extensive technological research into the development of a system for the conversion of fish into FPC (fish protein concentrate) of good quality with a promising market potential.</p> <p>A viable protein-concentrate industry will require the use of a number of different species as sources of raw material. FPC of high quality has been produced from hake, as well as from oily species such as menhaden, herring, and anchovy. The need for high-quality marine protein for both human and animal use dictates a continuing search for suitable raw materials.</p> <p>In any assessment of other marine sources of protein, mussels appear very promising. Their wide distribution, fecundity, rate of growth and growth density already have been adapted to highly successful culture systems in many parts of the world.</p> <p>To explore the feasibility of using mussels as a source of dry, protein concentrate, we prepared samples from Puget Sound bay mussels (<i>Mytilus edulis</i>).</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 12 PAGE 13 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: L. Baldwin</p> <p>Reprinted in part</p>

6.37

Inconclusive, the results generally indicate that Chlorella in its natural form is rather difficult for humans to digest, and the appearance of the product was not generally well accepted. The Japanese, however, have a high level of acceptance and tolerance for the product. This indicates that the digestive system of humans can adapt to various changes in the diet. Also, breaking down the cellular structure of Chlorella by physical or chemical means would make this alga easily digestible.

By a suitable manipulation of variables, green algae containing as much as 50 percent or more protein, on a dry-weight basis, can be manufactured continuously on a large scale. [1 figure, 23 references]

[Abstracted: L. Baldwin]

This book, which is based on patent literature, indexes by company, inventor, and patent number 126 methods of producing protein materials. Its eight chapters, organized by base material, describe the methods of producing proteins by hydrocarbon fermentation and from fish, soybeans, cottonseed, other oilseeds and legumes, wheat and gluten, milk, and miscellaneous materials, such as algae. One chapter covers production of textured foods, such as meat substitutes.

[Abstracted: L. Baldwin]

Protein Food Supplements-69
Noyes, Robert
Published by Noyes Development Corp., Park Ridge, New Jersey. \$35. (n.d.)
Food Processing 30, No. 9, 63 (September 1969)

REVIEW OF PROTEIN PRODUCTION METHODS

6.190

A group from Texas A. & M. University compared the effect of feeding laying hens different levels of calcium from two different sources. The results tabulated below show that hens can use Ca from calcium carbonate and oyster shell flour equally well.

Calcium source	Hen-day production when Ca fed at a percentage level of				Performance average	Egg size g.	Feed conversion kg.feed/kg.eggs
	2.00	2.75	3.50	4.25			
Calcium carbonate	67	68	71	69	68.67	60.7	2.68
Oyster shell flour	69	69	67	67	68.33	61.6	2.62

The author notes that the equivalent value of these two calcium sources has been reported many times previously.

A group from the University of Arkansas compared the content and availability of 17 different amino acids occurring in 7 different fish meals. Both content and availability of cystine, methionine, and lysine varied appreciably among the meals, Peruvian meals and herring meals having the highest. Availability was measured by disappearance from the intestines; the presence of antioxidants had no effect on this property.

6.54

To evaluate the nutritional and chemical characteristics of mussel protein concentrate (MPC), samples produced by isopropanol extraction of steamed mussel meats were analyzed for proximate composition, minerals, and protein efficiency ratio (PER). Table 1 shows the results of these analyses.

MPC is readily dispersible in water--a characteristic probably related to its high content of glycogen.

The technology for mass production at low cost of protein concentrate suitable for human use is now being developed. A thorough assessment of all promising sources of raw material is obviously needed. Mussels should be given high priority in any such investigation. This is strongly suggested by the high quality of the test samples of MPC produced in Seattle; the apparent environmental similarities of potential growing areas in North America with areas of high production of cultivated mussels in Europe and the Far East; and the relative ease with which harvesting of cultured mussels could be controlled to avoid danger from paralytic shellfish poisoning. [2 figures, 3 tables, 3 references]

Table 1 - Nutritional Evaluation and Chemical Composition of Mussel Protein Concentrate		
Test or Component	Test Value or Concentration	3.61/
PER	70.0 percent	
Ash	12.0 percent	
Lipid	0.2 percent	
Carbohydrate (glycogen)	15.0 percent	
Fluoride	<5 p.p.m.	
I/Casein equal to 3.0.		

6.51

Although the catfish feed is receiving a great deal of attention because of the expansion of the catfish-farming industry, the firm continues to produce a liquid conditioner for horses, calves, cattle, dogs, and cats. The liquid cattle supplement contains fermented tuna broth with an abundance of brewers yeast and pure cane molasses. It is agitated and homogenized twice to ensure stability. The product is 35 percent protein and 96 percent digestible. It produces not only enzymes and bacteria but growth factors as well. It is fed free choice to cattle in pastures or feedlots--the cows lap it up by licking a feeder wheel that revolves through the liquid.

The fresh fish broth, or stickwater, that is used in the latter product is obtained from three large tuna canneries in Puerto Rico. It is piped directly to a central fermentation plant, where it is mixed with molasses (a source of carbohydrates), brought from the sugar cane facilities at Mayaguez, and large quantities of yeast, obtained from a Puerto Rican brewer. The alcohol created during fermentation is distilled off and stored until the residue is concentrated by removal of moisture; then the alcohol is returned to the concentrate. This premix is shipped by tanker to Mobile, where it is homogenized with liquid urea, phosphoric acid, blackstrap molasses, vitamins, and minerals. It is distributed to consumers in small (about 1,300 gal.) tank trucks. Most buyers are dairymen, brood cattle herdsman, and feedlot owners who raise beef for slaughter. Rico's director of marketing believes that this feed supplement is one step toward satisfying the urgent need for speeded-up beef production.

[2 photographs]

6.55
(9.6)

40 YEARS OF IMPROVEMENT IN ANIMAL FEEDS

Anonymous

Feedstuffs 41, No. 36, 220 pp. (September 6, 1969)

This 40th anniversary issue of Feedstuffs documents the growth of animal agribusiness and the contributions of the feed industries to the production of better foods at economical prices. Technological developments that have accounted for this progress are highlighted in special articles. Among these articles are the following:

"40 Years of Progress in Beef Cattle Nutrition," by W. M. Beeson (Purdue University, Lafayette, Indiana). pp. 74, 146-148, 150, 152. (9 tables, 1 photograph, 35 references)

"The Effect of Nutritional Discoveries Upon the Economy of Poultry Production Over the Past 50 Years," by M. L. Scott (Cornell University, Ithaca, New York). pp. 76-77, 152, 154. (17 tables, 4 photographs)

"Progress in Broiler Feed Formulation" [G. H. Arscott (Department of Poultry Science, Oregon State University, Corvallis)]. p. 80. (2 tables, 2 figures)

"40 Years of Change in Layer Feeds and Feeding," by E. P. Singsen (University of Connecticut, Storrs). p. 84. (1 figure, 1 table, 1 photograph)
(over)

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UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

Abstracter: L. Baldwin

7.51

NEWER METHODS OF ASSESSING PROTEIN QUALITY

Bender, A. E. (Nutrition Department, Queen Elizabeth College, Campden Hill, London W.8, England)
Chemistry and Industry No. 27, 904-909 (July 5, 1969)

"Protein quality" is the term applied to the usefulness of a given protein for a given purpose. That purpose may be growth, recovery, production of milk, or any number of other biological or chemical functions. The most direct way of determining the usefulness of a protein food for one of these purposes, of course, would be to feed it to a test animal and then measure the function. But such measurements are time consuming and expensive, and the growing interest in the quality of proteins, coupled with a growing demand for quality control in the factory, dictate the introduction of more rapid, reliable methods of assay.

The author reviews some of the methods most commonly used to test the nutritive value of proteins--assays for biological value, net protein utilization, and protein efficiency ratio--and gives their shortcomings. He shows how the change in approach from determination of overall nutritive values to determinations of available individual amino acids brought on a change in the methods of assay, and he describes and evaluates some of these methods. Then he describes and assesses the usefulness of eight of the newer methods of determining protein quality:

chemical estimation of available lysine value, measurement of a protein's dye-binding capacity, microbiological assay of available amino acids, assay of amino acids liberated by enzymic hydrolysis of the protein, use of the pepsin digest residue amino acid index, comparison of the biological values of a protein with

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Abstracter: L. Baldwin

7.53

SEMIMICRO METHOD FOR DETERMINING TOTAL LIPIDS IN FISH MEAL

Ambrose, Mary E., Barbara J. Roche, and George M. Knobl, Jr. (National Center for Fish Protein Concentrate, College Park, Maryland 20740)
Journal of the Association of Official Analytical Chemists 52, No. 4, 688-692
(July 1969)

Information on the composition and quality of fish meal is needed to facilitate trade and utilization of such products. The consistency of such data may often depend upon the method of analyzing a given component. The methods of analysis of lipids in fish meal vary considerably. Also, the lipids of fish oxidize readily so that the data obtained by different methods may vary considerably when used on fish meals containing oxidized lipids. Smith, Ambrose, and Knobl (1964) developed a method of extraction with chloroform and ethanol but the method is cumbersome and requires large amounts of solvent. The purpose of the present study was to improve the Smith et al. method by reducing the amount of solvent used and by changing the drying method so that the analysis can be completed in a shorter time.

The authors developed a simple and rapid method for determining lipids in fish meal. Twelve samples can be completed in 1 day by the proposed method; the same number of samples requires 3 days by the present AOAC (Association of Official Analytical Chemists) method. Results are comparable to those derived by the AOAC
(over)

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Abstracter: F. T. Piskur

8.50

PROXIMATE COMPOSITION OF COMMERCIAL FISHES
FROM THE MEDITERRANEAN SEA AND THE RED SEA

Herzberg, A., and Rachel Pasteur (Sea Fisheries Research Station, Department of Fisheries, Ministry of Agriculture, Haifa, Israel)
Fishery Industrial Research 5, No. 2, 39-65 (July 1969)

The development of fisheries in subtropical and tropical areas has aroused interest in species of fishes that have not previously been marketed in significant quantities. Since some of these species doubtless have value either as a fresh or a canned product or as fish meal, the authors determined the proximate composition of 10 species native to the Mediterranean and the Red Sea.

The proportions of protein, oil, ash, and water in the fishes were examined on a year-round basis. The relatively high concentration of protein in all the fishes, coupled with the low concentration of oil in most of the demersal fishes, showed that the fishes in the area could be used as a source of fish protein concentrate (FPC). The authors prepared satisfactory samples of FPC from *Nemipterus japonicus* (threadfin bream) and *Saurida tumbil* (Red Sea lizardfish) in their laboratory. They used isopropanol for the extraction. Both types of FPC were almost tasteless and odorless.

The wide changes in the concentration of oil in the pelagic fishes point to a need for a determination of the seasons when these and similar species would be most usable for canning. The authors suggest that such changes are probably related to the spawning cycle. Although no differences in chemical composition were

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<p>8.51 (1.11, 6.54)</p> <p>VARIATION OF THE MUSCLE PROTEIN IN HORSE MACKEREL</p> <p>Suzuki, Taneko, Koichi Kanna (Tokai Regional Fisheries Research Laboratory, Ka- chidoki, Chuo-ku, Tokyo, Japan), and Taneji Yamamoto (National Federation of Fish Jelly Processing Cooperative Association of Japan, Kanda Sakumacho, Chuo- ku, Tokyo)</p> <p>Bulletin of the Japanese Society of Scientific Fisheries <u>35</u>, No. 5, 451-458 (May 1969)</p> <p>Post-mortem changes in the physicochemical properties of myofibrillar protein of fish have been classified into two types: the protein that changes little after death and the protein that changes easily as post-mortem time progresses. However, the myofibrillar protein of horse mackerel (<i>Trachurus japonicus</i>) seems to fall somewhere between these two types. The authors conducted this study to see if the variations occasionally observed in the properties of horse mackerel pro- tein were caused by such variables as fishing ground, method of catch, and season.</p> <p>Ultracentrifugal schlieren patterns, the flow birefringence of 0.6 M KCl ex- tracts, crude fat content, and the gel-forming ability of the white meat were de- termined. Four types of post-mortem change were observed: (1) the peak of actomyosin becomes lower and broader and the sedimentation velocity increases as the time after death progresses; gel strength remains high only when the muscle is fresh; (2) the peak of actomyosin remains very sharp and the sedimentation (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 22 NO. 12 PAGE 17 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: L. Baldwin</p>	<p>8.59</p> <p>CHEMICAL STUDIES ON COMPONENTS OF DRIED BONITO, "KATSUBUSHI" PART II. VOLATILE NEUTRAL, NON-CARBONYL OXYGENATED COMPOUNDS</p> <p>Sasaki, Shigeru (Research Laboratories, T. Hasegawa Co., Ltd., Nihonbashi, Tokyo, Japan), Soichi Arai, Hiromichi Kato, and Masao Fujimaki (Department of Ag- ricultural Chemistry, The University of Tokyo, Tokyo)</p> <p>Agricultural and Biological Chemistry <u>33</u>, No. 7, 1037-1041 (July 1969)</p> <p>"Katsubushi" is a dried seasoning prepared from bonito (<i>Katsuwonus pelamis</i>). The present paper reports on one aspect of a research program to determine the nature of those components of Katsubushi that contribute to the flavor of the product. The paper deals with the estimation and identification of some free alcohols and of esters in Katsubushi.</p> <p>The flavor components of Katsubushi were extracted with 80 percent ethanol. The extract was concentrated under vacuum, then steam distilled. The distillate was separated into basic, acidic, phenolic, and neutral fractions. The neutral, noncarbonyl oxygenated fraction was analyzed by gas chromatography.</p> <p>The following compounds were tentatively identified:</p> <p>Free alcohols: 2-pentanol and 2-methyl-1-heptanol</p> <p>Constituents of esters: <u>n</u>-butanol, isobutanol, <u>n</u>-pentanol, and <u>n</u>-dodeca- nol; the carboxylic acids--propanoic, <u>n</u>-butanoic, <u>n</u>-pentanoic, and <u>n</u>-dodeca- <u>n</u>-octanoic, <u>n</u>-nonanoic, <u>n</u>-decanoic, <u>n</u>-dodecanoic, <u>n</u>-tetradecanoic, and <u>n</u>-hexadecanoic. (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 22 NO. 12 PAGE 17 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: F. T. Piskur</p>
<p>8.51 (7.52, 1.35, 1.37)</p> <p>A NOVEL COMPOSITION OF PHOSVITINS FROM SALMON AND TROUT ROE</p> <p>Mano, Yoshitake, and Mihoko Yoshida (Department of Biochemistry, Faculty of Medi- cine, University of Tokyo, Bunkyo-ku, Tokyo, Japan)</p> <p>Journal of Biochemistry <u>66</u>, No. 1, 105-108 (July 1969)</p> <p>In 1966, Mano and Lipmann found that the phosvitins from a variety of fish roes had a similar amino-acid composition but differed in detail according to fish species. The basic amino-acid composition was characterized by the predom- inance of serine and the modicum of certain other amino acids. Sulfur-containing and aromatic amino acids especially were lacking. However, the lack of aromatic amino acids was not universal. In the present paper, the authors report their findings about the composition of phosvitins from the roe of dog salmon (<i>Oncorhyn- cus keta</i>) and rainbow trout (<i>Salmo irideus</i>), and they describe the method by which they obtained their results. (This preparative method, they say, is applicable to all kinds of fish roe but not to other tissues or to hen eggs. Its yield is almost quantitative.)</p> <p>The phosvitins obtained from the fractions having the highest phosphorus con- tent were homogeneous in chromatograms and schlieren patterns. The data (see back of card) show the similarity of salmon and trout phosvitins. Further, both salmon- and trout-roe phosvitins had the following moles of amino acid per mole- cule: lysine, 5; histidine, cysteine, valine, methionine, leucine, phenylalanine, (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 22 NO. 12 PAGE 17 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: L. Baldwin</p>	<p>8.8 (2.03)</p> <p>NUCLEOTIDE DEGRADATION IN FROZEN SWORDFISH MUSCLE</p> <p>Dyer, W. J., and Doris I. Hiltz (Fisheries Research Board of Canada Halifax Lab- oratory, Halifax, Nova Scotia)</p> <p>Journal of the Fisheries Research Board of Canada <u>26</u>, No. 6, 1597-1603 (June 1969)</p> <p>The measure of the extent of the postmortem degradation of nucleotides in fish has been used as an index of quality of the fish. The degradation sequence is adenosine triphosphate → inosine monophosphate (IMP) → inosine (Ino) → hypo- xanthine (Hx). The value of the measure of these compounds as a quality index would depend upon the stability of these compounds during frozen storage of the fish. Dyer et al. (1966) noted that IMP degraded slowly in swordfish stored at -4° C. In the same fish, Ino accumulates with very slow formation of Hx, showing that Ino ribohydrolase activity is lower than that of the IMP phosphohydrolase. Also, the rates are affected very little by the initial quality of the fish, sug- gesting that endogenous enzymes--rather than bacterial enzymes--are involved.</p> <p>In the present study, the authors determined the nucleotide degradation rates in frozen swordfish steaks stored at -26°, -18°, and -8° C. and compared the val- ues obtained with taste-panel assessments of the quality of the steaks.</p> <p>IMP dephosphorylation was active in swordfish steaks stored at -8° C. but less active in steaks stored at -18° C. The rates of loss were about 0.24 and 0.029 μmoles of IMP per gram of fish per week at -8° C. and -18° C., respectively. (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 22 NO. 12 PAGE 17 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: F. T. Piskur</p>

2-Methyl-1-heptanol exhibits a fresh woody aroma and seems to provide the major contribution to the flavor of Katsubushi.
[6 figures, 2 tables, 7 references]

Start, Åke (Institute of Analytical Chemistry, University of Stockholm, Stockholm, Sweden)
Journal of Agricultural and Food Chemistry **17**, No. 4, 871-873 (July-August 1969)

The authors suggest that the IMP level is not a good indicator of the quality of frozen swordfish. Possibly the strong flavor of the swordfish obscures any loss in flavor resulting from the decrease in IMP. Hx level may be used as a index of prefreezing quality because it forms slowly at low-storage temperatures; however, red muscle must not be used in the sample because it has a high initial content of Hx (about 1.9 μ moles of Hx per gram of red muscle). [4 figures, 11 references]

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Elison, K. G. R. (Department of Agriculture and Fisheries for Scotland, Marine Laboratory, P.O. Box 101, Torry, Aberdeen, Scotland)
 Nature 223, No. 5209, 968 (August 30, 1969)

figures, 1 table, 16 references]

vin characteristic	Salmon	Trout
molecular weight	19,000-500	19,350-550
isoelectric point (pI)	10.2	9.8
alkali labile P (%)	95	97
amine content (μmoles/mg.)	3.54	3.57

tryptophan, 0; glutamic acid,

ity remains almost constant for a long time after death; gel strength remains very high even if the muscle is not fresh; (3) the peak of actomyosin broad and broad but the sedimentation velocity remains unchanged as the time of death increases; gel strength remains high only when the muscle is fresh; (4) the peak of actomyosin is broad and low even in very fresh muscle, almost disappearing as the muscle ages; a gel will not form no matter how fresh the muscle may be. The fishing ground, the fishing method, or the season apparently has no effect on any of these properties.

<p>8.8 (0.5)</p> <p>MICROBIOLOGICAL EVALUATION OF PACIFIC SHRIMP PROCESSING</p> <p>Harrison, Janice M., and J. S. Lee (Department of Food Science and Technology, Oregon State University, Corvallis 97331) Applied Microbiology 18, No. 2, 188-192 (August 1969)</p> <p>Little information is available on the microbiological aspects of commercially produced Pacific shrimp, (<i>Pandalus jordani</i>). The industry in Oregon and Washington is relatively new, and data on the microbiology of Pacific shrimp provide the basis for maintaining and improving quality control practices.</p> <p>Two plants were selected for the test. Samples of shrimp were selected from five key points in the processing line, including samples of shrimp taken just before the product was packaged. Standard bacteriological procedures were used and were identified in the literature references.</p> <p>The microbial count of the shrimp taken at five key locations in the processing line ranged from 1.3×10^6 to 3.0×10^6. The microbial flora of the initial shrimp sample (the shrimp in the boxes delivered from the vessel) consisted of (in decreasing order of predominance): <i>Acinetobacter-Moraxella</i>, <i>Flavobacterium</i>, <i>Pseudomonas</i>, gram-positive cocci, and <i>Bacillus</i> species. No yeasts were found. Differences in processing procedures between the two plants were reflected in both total microbial count and microbial flora. The microbial load on the shrimp</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 12 PAGE 19 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: F. T. Piskur</p>	<p>8.8</p> <p>SYMPOSIUM ON IMPORTANCE OF NONVOLATILE COMPOUNDS IN FLAVOR</p> <p>Journal of Agricultural and Food Chemistry 17, No. 4, 677-746 (July-August 1969)</p> <p>The symposium was presented at the 156th Meeting of the American Chemical Society, Atlantic City, New Jersey, September 1968. Fourteen papers were presented; those of direct interest to commercial fisheries are reported as follows:</p> <p>"Role of Lipids in Flavors," David A. Forss (International Flavors & Fragrances, Inc., Union Beach, New Jersey 07735), pp. 681-685.</p> <p>Lipids may serve as precursors in their contribution to the flavor of foods. Free fatty acids formed by hydrolysis, aldehydes formed by oxidation of unsaturated fatty acids, and ketones from oxidized lipids may contribute to desirable flavors and to undesirable flavors. The intact lipid or the low breakdown products of lipids contribute to flavor largely through stimulation of the sense organs of the mouth. Lipids modify the taste and flavor of other compounds in food, particularly those of low polarity. Lipids also modify the physical state of the food and, in turn, may affect the movement of compounds to the taste and odor receptors. [4 figures, 40 references]</p> <p>"The Taste of Amino Acids, Peptides, and Proteins," Juerg Solms (Institute of Agricultural Chemistry, Swiss Federal Institute of Technology, 8006 Zurich, Switzerland), pp. 686-688.</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 12 PAGE 19 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: F. T. Piskur</p>
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<p>8.8</p> <p>SYMPOSIUM ON IMPORTANCE OF NONVOLATILE COMPOUNDS IN FLAVOR</p> <p>Card 2</p> <p>Journal of Agricultural and Food Chemistry 17, No. 4, 677-746 (July-August 1969)</p> <p>"Meat and Fish Flavors. Significance of Ribomononucleotides and Their Metabolites," N. R. Jones (Tropical Products Institute, 56-62, Gray's Inn Road, London, England), pp. 712-716.</p> <p>This review paper covers: (1) The natural tastes of ribomononucleotides and their breakdown products, separately and in mixtures, (2) the flavor-enhancing properties of ribomononucleotides and their breakdown products and the composite effects of these compounds in the presence of other compounds, (3) the flavor-precursing qualities of ribomononucleotides and their metabolites by reaction with other groups of compounds during cooling, processing, and storage, (4) ribomononucleotides as key biochemical determinants of concentrations of other flavorous compounds, and (5) the estimation of 5'-ribomononucleotide and their breakdown products, particularly hypoxanthine as indices of freshness and quality of meat and fish products. [75 references]</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 12 PAGE 19 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: F. T. Piskur</p>	<p>9.19</p> <p>RUSSIAN APPROACH TO OIL POLLUTION</p> <p>Anonymous New Scientist 43, No. 663, 389 (August 21, 1969)</p> <p>Shortly after the Torrey Canyon incident, the Soviet Union held a competition for new ways of combatting oil pollution. Of the more than 200 ideas submitted, most seem to be mechanical rather than chemical, though a new and highly effective, biologically harmless, chemical compound (unnamed) is being tested at Odessa.</p> <p>One of the mechanical means being tested and developed involves a boat that collects floating debris and oil of any viscosity (up to 2 m. long and 70 kg. in weight) from the surface of the water. At the prow, the boat is fitted with rotating shields that provide for a scooping width of up to 8 m. Although she is comparatively small (14.85 m. long, 4.3 m. wide, 2 m. in hull height, and 1.6 m. in average draft), her collecting capacity is quite large--about 15 m.3 of oil and 4 m.3 of debris. She is quite maneuverable and can move at 3.8 knots. Upon being scooped up, the oil enters a receiving and settling bath, where it is separated from the debris. The layer of oil that settles in the bath is pumped to other tanks for further separation and eventually transfer to shore; the debris is loaded into a removable scoop and lifted ashore by crane. High viscosity oil that cannot be handled by the pumps in cold weather is loaded mechanically into the scoop. All operations are mechanized, so the boat requires a crew of only two.</p> <p>The Soviet Union is presently building--on a large scale--floating cleaner ships for use in washing out oil tankers and the fuel reservoirs of dry-cargo ships. To make the cleaning operation faster and more effective, a device made</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 12 PAGE 19 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>Abstracter: L. Baldwin</p>
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0.32 HEAT GELLING PROPERTIES OF MYOSIN, ACTIN, ACTOMYOSIN
AND MYOSIN-SUBUNITS IN A SALINE MODEL SYSTEM

Samejima, K., and Y. Hashimoto (The College of Dairy Agriculture, Nishinipporo, Ebetsu, Hokkaido, Japan), T. Yasui, and T. Fukazawa (Department of Animal Science, Faculty of Agriculture, Hokkaido University, Sapporo, Hokkaido) *Journal of Food Science* **34**, No. 3, 242-245 (May-June 1969)

This paper reports on a study of the heat-gelling properties of isolated myosin, actin, and actomyosin in saline model systems. Such information is valuable to the manufacturer of cured meat products such as sausages, because the binding and water-holding properties of meat, when cooked, appear to be important factors that influence quality of the product.

Myosin and actin were isolated from the skeletal muscle of the rabbit. The gelation of myosin, actin, and actomyosin, and of heavy and light meromyosins derived from myosin by treatment with trypsin, by heat was observed in various systems.

Apparently the gelling properties of these proteins do not run parallel to those of saline model system composed of these proteins and stroma. Actin does not exert any influence on the binding properties of the system; however, when F actin and myosin A are both present, the resulting binding properties are considerably improved. Because heavy and light meromyosins have little influence on binding properties, the authors conclude that an intact molecule of myosin is required for development of binding properties upon heating.

[Abstract: F. T. Piskur]

[6 figures, 24 references]

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0.5 RAPID TECHNIQUE FOR ENUMERATION AND ISOLATION
OF PEROXIDASE-PRODUCING MICROORGANISMS

Bordeleau, Lucien M., and Richard Bartha (Department of Biochemistry and Microbiology, Rutgers, The State University, New Brunswick, New Jersey 08904) *Applied Microbiology* **18**, No. 2, 274-275 (August 1969)

Peroxidases (enzymes that catalyze the dehydrogenation of various substances in the presence of hydrogen peroxide) are widespread in plants, animals, and microorganisms and have been shown to perform the oxidative condensation of certain phenols and aromatic amines. Bartha and Bordeleau (in press) showed that peroxidases in soil were implicated in the production of azo compounds from the aniline residues of certain herbicides. In that study of the possible relation between peroxidases of microbial origin and the formation of azobenzenes in natural soil, the researchers designed and applied a rapid technique for the enumeration and isolation of peroxidase-producing soil microorganisms. The present paper reports on this technique.

Peroxidase-positive microorganisms were enumerated on agar plates by use of a p-anisidine-H₂O₂ spray. The same technique, using replicated plating, can be used to selectively isolate the peroxidase-producing microbial cultures. The technique is simple, rapid, and reliable.

[1 figure, 1 table, 6 references]

[Abstract: F. T. Piskur]

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1.55

(1.52, 1.0115,
1.01111)

Anonymous

Quick Frozen Foods **31**, No. 12, 99-100 (July 1969)

In 1965, the catch of haddock in the Northwest Atlantic was 155,000 metric tons. In 1968, it was 45,000 tons. In 1970, it is expected to be 14,000 tons. This condition has had two results. (1) The International Commission for the Northwest Atlantic Fisheries, meeting in Warsaw in June, recommended a closed season during March and April of 1970-1972 and catch quotas of 12,000 metric tons on Georges Bank and 18,000 metric tons on Browns Bank, off Nova Scotia. Fisheries scientists would have preferred complete closure of the fishery in order to replenish the stock. (2) New England and Canadian fishermen are converting their vessels so they can fish for pollock as a replacement for the dwindling haddock. The costs of converting off-bottom trawlers is relatively cheap--\$3,000 or \$4,000. But, since pollock swim at midwater levels rather than near the bottom, as haddock do, expensive electronic gear is needed to find and catch them, and crews must be trained to operate the equipment. Thus the total cost of conversion comes to about \$50,000. As a result, ex-haddock fishermen are asking the Federal government to underwrite part of the cost because of their condition as a distress industry.

Pollock tastes almost like haddock, its meat having a fine texture. The resource is said to be able to easily support an annual catch of 200 million lb. a year without the supply's being damaged.

[2 photographs]

[Abstract: L. Baldwin]

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2.1473
(1.12, 2.12)

STUDIES ON THE FISHING MECHANISM OF TUNA LONG-LINE--I.
RELATION BETWEEN CATCH AND SIZE OF THE GEAR

Hirayama, Nobuo (Tokyo University of Fisheries, Konan-4, Minato-ku, Tokyo, Japan) *Bulletin of the Japanese Society of Scientific Fisheries* **35**, No. 6, 546-549 (June 1969) (In Japanese; summary and figures in English)

The relation between the behavior of tuna and the characteristics of the tuna longline (the size of the gear: the hook intervals, and the length of the mainline, the branch line, and the float line) is studied in the light of data obtained from longliners using various sizes of gear. Two equations were derived to express the results: $C = st \times d \times r$ (when $d > r$); and $C = st \times 2r$ (when $d < r$). (C) the catch, s = the density of the school in a fishing ground, t = the soak time for the bait, d = the distance between hooks, and r = the radius of an estimated spherical area within which the fish are likely to be attracted.) The depth at which the hooks are suspended has virtually no effect on the catch.

[Abstract: L. Baldwin]

[8 figures, 2 references]

[Abstract: L. Baldwin]

Since materials to be frozen are conveyed in a helical path, the apparatus can be compact. Moreover, the amount of insulation is small, since none is needed between the successive turns of the helical path, which correspond to the top and bottom walls of a freezing tunnel.

British Patent 1,147,558
Brødrene Gram, A/S, Vojens, Denmark (pat.)
Modern Refrigeration and Air Conditioning **72**, No. 857, 67 (August 1969)

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FREEZING APPARATUS

<p>0.5</p> <p>CATION INTERACTIONS AND BIOCHEMICAL COMPOSITION OF THE CELL ENVELOPE OF A MARINE BACTERIUM</p> <p>De Voe, Irving W., and Evelyn L. Oginsky (Department of Microbiology, University of Oregon Medical School, Portland 97201) Journal of Bacteriology <u>92</u>, No. 3, 1368-1377 (June 1969)</p> <p>The purpose of this study was to define more clearly the roles of Na^+ and Mg^{++} in the isolated envelopes of a marine bacterium.</p> <p>Comparisons were made of the susceptibility of a marine isolate and of a terrestrial isolate to disintegration in distilled water after exposure to 0.05 M MgCl_2 and to 0.1 and 1.0 M NaCl. After exposure to MgCl_2, both types of envelopes remained intact in distilled water after exposure to 1.0 M NaCl, envelopes of the marine isolate fragmented in distilled water, but the envelope of the terrestrial isolate did not. Partial reaggregation of the fragments of the envelope of the marine isolate occurred on the addition of MgCl_2. The envelopes of the marine isolate contained lipopolysaccharide, muramic acid, and a variety of phospholipids. The amino-acid distributions in the acid hydrolysates of the envelopes of the marine isolate and the terrestrial isolate were similar, but the amino-acid content of the envelope of the terrestrial isolate was twice that of the envelope of the marine isolate.</p> <p>[8 figures, 4 tables, 28 references]</p> <p>----- [Abstracter: F. T. Piskur] ----- Abbassov, D. R. (U.S.S.R.) Chemical Abstracts <u>70</u>, No. 12, 49061e (March 24, 1969)</p>	<p>2.1473 (1.12, 2.12)</p> <p>STUDIES ON THE FISHING MECHANISM OF TUNA LONG-LINE--II. RELATION BETWEEN SETTING COURSE OF THE GEAR AND MOVING DIRECTION OF THE FISH</p> <p>Hirayama, Nobuo (Tokyo University of Fisheries, Konan-4, Minato-ku, Tokyo, Japan) Bulletin of the Japanese Society of Scientific Fisheries <u>35</u>, No. 6, 550-554 (June 1969) (In Japanese; summary, figures, and table in English)</p> <p>In the operation of a tuna longline, the fisherman will have very good catches if he sets his line so as to intersect the school at a right angle to the direction of its movement. In this paper, the author treats the relation between the movement of the fish and the direction of setting the longline. He assumes that (1) the catch (F) is proportional to the number of fish (S) that encounter the longline, and (2) the school is moving in a certain definite direction at a constant speed (v). On the basis of these assumptions, $S = Nv/\sin \theta$, where N is the density of fish in the fishing ground, θ is the angle of fish movement against the longline, \bar{t} is the mean soak time of the gear, and L is the total length of the longline. F was derived by the following equation: $F = \alpha N v \sin \theta \bar{t} L$, where α is the catch rate of an individual piece of gear.</p> <p>From the equation for catch and the data for current direction, moving directions of the schools were estimated. Since most tuna move against the current, the most effective setting for the gear is in a direction normal to the current.</p> <p>[5 figures, 1 table, 2 references] [Abstracter: L. Baldwin]</p>
<p>0.33</p> <p>MECHANISMS OF BROWNING DEGRADATION OF D-FRUCTOSE IN SPECIAL COMPARISON WITH D-GLUCOSE-GLYCINE REACTION</p> <p>Kato, Hiromichi, Mitsuyoshi Yamamoto, and Masao Fujimaki (Department of Agricultural Chemistry, The University of Tokyo, Japan) Agricultural and Biological Chemistry <u>33</u>, No. 6, 939-948 (June 1969)</p> <p>The mechanism of the browning reaction involving the fructose-amino acid system is yet unexplained. Hodge (1953) observed that the browning reactivity of D-fructose with amino acids was somewhat stronger than that of D-glucose. Also, the yields of aldoseamino acids and of fructoseamino acids from D-fructose and amino acids in an aqueous system were considerably less than the yields of fructoseamino acids from D-glucose and amino acids (Anet and Reynolds, 1957). The present paper reports on a study of the degradation mechanisms of D-fructose with or without amino acids or organic acids in aqueous solution in comparison with the D-glucose-glycine reaction.</p> <p>The researchers found substantial difference between the mechanism of the fructose degradation and the glucose-glycine reaction. D-Fructose browned more intensely than did D-glucose in the lower concentrations of glycine. D-Fructose, by catalytic action of carboxylate anions (without condensation with amino groups), decomposed to 3-deoxy-D-erythrohexosulose, 5-(hydroxymethyl)-2-furaldehyde and, to a lesser extent, it formed pyruvaldehyde through caramelization. The authors believe that the main path of fructose degradation was 1,2-enolization but 2,3-enolization occurred to a small extent.</p> <p>[7 figures, 5 tables, 33 references] [Abstracter: F. T. Piskur]</p>	<p>2.116</p> <p>MEASUREMENT OF POWER</p> <p>Anonymous Commercial Fishing <u>8</u>, No. 4, 10 (April 1969)</p> <p>Problem.--Skippers, owners, and engineers need to know how much power is being delivered to the propeller so that they can keep check on the condition of the engine and the hull, on the amount of fuel being consumed, and on the efficiency at which the vessel is being operated. Also, such knowledge is needed when specifications for new vessels are being drawn up.</p> <p>Solution.--The Industrial Development Unit of the White Fish Authority has designed and tested a cheap, simple, reliable torsion meter for measuring propeller shaft power. The basic system consists of a simple strain-gauge bridge that incorporates foil strain gauges, wrap-on slip rings, and d.c. energizers. It can be fitted to existing propeller shafts, or it can be inserted in the form of a specially precalibrated torsion meter into new shafts. The equipment costs about \$1,000--\$600 for the components that are fitted to the shaft and \$400 for the indicating instrument that is connected to them. The system has been successfully used on vessels ranging in size from a 70-ft. seine netter to a 240-ft. distant-water stern trawler. It has proved capable of maintaining calibration for several months under the most arduous conditions, even in Arctic and North Atlantic waters.</p> <p>Owners, engineers, or designers who wish to obtain further details are invited to write to the Head of the Industrial Development Unit, White Fish Authority, South Side, St. Andrew's Dock, Hull, East Yorkshire, England. [Abstracter: L. Baldwin]</p>
<p>0.9</p> <p>POSSIBLE INDUSTRIAL USE OF APSHERON SALT LAKES FOR PREPARING NATURAL SODIUM SULFATE BY A BASIN METHOD FROM CASPIAN SEA WATERS</p> <p>Abbassov, D. R. (U.S.S.R.) Chemical Abstracts <u>70</u>, No. 12, 49061e (March 24, 1969)</p>	

2.8 FROZEN FOOD PACKER'S SPECIAL GUIDE
(3.235) TO SPICES IN PREPARED FOODS

Anonymous

Quick Frozen Foods 31, No. 12, 91-94 (July 1969)

Recognizing that most dishes from other lands differ from American dishes mainly in their flavor, and that some 60 percent of homemakers have told market researchers that they find it necessary to add their own seasoning before serving manufactured convenience foods, the author, with the help of the American Spice Trade Association, has assembled a foods spice chart to (1) help the American housewife vary her menus and bring new interest to the dinner table, (2) help frozen food packers compare the seasoning combinations they are now using with those used in some less well-known recipes, and (3) provide a source of new product ideas. Among the recipes (and the country of origin) in the chart are those for crab gumbo (Bahamas), clams oreganata (Italy), shrimp curry (India), bouillabaise (France), and shrimp luau (Hawaii).

Readers may get the full recipe for the dishes on the chart by requesting it, by name, from the Information Bureau, American Spice Trade Association, Empire State Building, New York, New York.

[1 chart, 2 photographs]

[Abstracter: L. Baldwin]

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3.15 NUTRITIVE COMPOSITION OF IRRADIATED GULF OYSTERS STORED IN ICE

Liuzzo, Joseph A., Stephen C. Lagarde, and Arthur F. Novak (Department of Food Science and Technology, Louisiana State University, Baton Rouge 70803)
Journal of Agricultural and Food Chemistry 17, No. 4, 764-766 (July-August 1969)

Novak et al. (1966) reported that Gulf oysters irradiated at a dose level of 0.2 Mrad could be satisfactorily preserved from the standpoint of organoleptic, chemical, and bacteriological criteria. The present study was carried out to determine the effect of irradiating Gulf oysters at the dose level recommended by Novak on the stability of the contents of moisture, ash, glycogen, crude protein, nonprotein nitrogen (NPN), true protein, crude fat, and soluble sugar.

The oysters were treated in each of three ways: control (nonirradiated), irradiated at 0.2 Mrad with Co⁶⁰, and irradiated at 0.4 Mrad. The samples were stored in ice. Samples were analyzed at 0-, 5-, 10-, 15-, and 20-day intervals.

Only the crude protein content was significantly affected by irradiation. When the crude protein values were converted to true protein values, the significance of the decrease was lost. Ash content (of control and irradiated samples) decreased significantly as storage time increased. These results tend to strengthen the feasibility of irradiation preservation of oysters.

[8 tables, 21 references]

[Abstracter: F. T. Piskur]

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7.44
(7.599)

DETERMINATION OF TOTAL NITROGEN IN WATER
BY MICROCOULOMETRIC TITRATION

Moore, Robert T., and James A. McNulty (Dohrmann Instruments Co., 1062 Linda Vista Avenue, Mountain View, California 94040)
Environmental Science and Technology 3, No. 8, 741-744 (August 1969)

In many situations relative to the commercial fisheries, we must know the total nitrogen content of a water system. For example: (1) the level of nitrogenous contaminants in streams must be monitored so pollution can be controlled; (2) the total nitrogen (and ammonical nitrogen) in sewage must be determined as a basis for treatment; and (3) nitrogen-containing pesticides in drainage waters must be measured for pesticide control.

The modified Kjeldahl procedure (A.O.A.C., 1960) includes the ammonia, organic, nitrate, and nitrite nitrogen but does not give a clear recovery of the nitrite nitrogen. The purpose of this study was to develop a procedure for the determination of total nitrogen including both organic and inorganic nitrogen.

The authors describe a system for measuring total nitrogen content in water down to 0.2 p.p.m. nitrogen in under 10 minutes. The water sample is pyrolyzed over a granular nickel catalyst in a stream of humidified hydrogen. The bound nitrogen in the sample is quantitatively converted to ammonia and the ammonia subsequently titrated electrochemically in a pH-sensitive cell.

[5 figures, 2 tables, 5 references]

[Abstracter: F. T. Piskur]

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7.51

TRITIUM LABELING OF PROTEINS BY THE FREE-RADICAL
INTERCEPTOR METHOD WITH THE AID OF ELECTRICAL DISCHARGE

White, Frederick H., Jr., Barbara Hauck, Hideo Kon, and Peter Riesz (National Heart Institute, National Institute of Arthritis and Metabolic Diseases and National Cancer Institute, National Institutes of Health, Bethesda, Maryland 20014)
Analytical Biochemistry 30, No. 2, 295-299 (August 1969)

The free-radical interceptor method (Riesz and White, 1968) is used for the study of carbon free-radicals that form on exposure of dry proteins to ionizing radiation. White and Riesz (1968) also suggested that the technique might find use in the preparation of tritium-labeled proteins. Gamma irradiation, however, presents a hazard and is expensive. The purpose of the present study was to find a more convenient means of creating a free-radical population similar to that found after gamma irradiation.

The lyophilized protein samples were exposed to an electrical discharge from a Tesla coil and subsequently exposed to tritiated hydrogen sulfide. Lysozyme was tritiated in this manner. The chromatography of tritiated lysozyme prepared by electrical discharge is similar to that prepared by gamma irradiation. Further, the results indicate that tritium is attached to a form of lysozyme that resembles the native protein. The authors point out that much work remains to be carried out to establish conclusively the extent of heterogeneity of protein tritiated by either material.

[2 figures, 12 references]

[Abstracter: F. T. Piskur]

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Miller, George A. (Food and Drug Administration, 909 First Avenue, Seattle, Washington 98104)
Journal of the Association of Official Analytical Chemists 52, No. 4, 692-695 (July 1969)

This was a collaborative study of two proposed methods for determining the drained weight of frozen Alaska king crab meat. The first method was that proposed by the Alaska King Crab Marketing and Quality Control Board; the second, the method for drained weight of frozen shrimp by Werren and Weik (1967) adapted to crab meat.

Authentic packs of frozen, unglazed king crab meat representing three packing methods were prepared. The packs were analyzed by the two methods by 10 collaborating laboratories.

Drained-weight recovery by the Alaska King Crab Board method was 96.2 ± 3.3 percent; recovery by the Werren and Weik method was 94.6 ± 2.4 percent. The author recommended that a similar drained-weight study be conducted on frozen Alaska king crab meat with added "flood water" and glaze and the results compared with those of the present study. Such information will serve as a basis for further recommended action on the methods.

[2 tables, 5 references] [Abstract: F. T. Piskur]

Learson, Robert J. (Technological Laboratory, U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Gloucester, Massachusetts 01930)
Journal of the Association of Official Analytical Chemists 52, No. 4, 703-707 (July 1969)

The purpose was to study, collaboratively, a proposed rapid electrophoretic method (using cellulose acetate as the supporting medium) for identifying species of fish. In this test the authentic fish samples were replaced with photographs of standard protein patterns from authentic species of fish.

Six "unknown" samples of fish were sent to 12 collaborators. The analysts, using the proposed electrophoretic method, were to identify the various species from the set of photographs representing standard protein patterns from nine species of fish.

Ten collaborators reported (two did not report) that correct identification of the "unknown" species from the photographic standards was extremely difficult. The analysts were able to match duplicate samples with an accuracy of 90 percent, but were able to correctly identify only 39 percent of the unknown samples. The author suggests that authentic samples are required for positive identification and that the method be subjected to further collaborative study using authentic fish samples for standards.

[5 figures, 2 tables, 2 references]

[Abstract: F. T. Piskur]

(1.86)

Inoue, Norio, and Terushige Motohiro (Laboratory of Marine Food Technology, Faculty of Fisheries, Hokkaido University, Hakodate, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 35, No. 6, 559-561 (June 1969)

In 1963, Maxwell and Baker reported that the starch gel electrophoretic patterns given by the hemocyanins of marine invertebrates could be used to characterize the various species. To classify some of the crabs living in waters near Hokkaido, the authors analyzed the electrophoretic patterns of the hemocyanins of king crab (*Paralithodes camtschaticus*), horse-hair crab (*Erimacrus isenbeckii*), and "zuwai-gani" crab (*Chionoecetes opilio*). The hemocyanins of king crab had three components, those of horse-hair crab had four, and those of zuwai-gani crab had five. The dominant component in the electrophoretic pattern of both king and horse-hair crab hemocyanin was much less mobile than the other components. In contrast, the hemocyanin of zuwai-gani crab gave a pattern in which the four major components were faster than the single minor component. The patterns given by the hemocyanin of horse-hair crab were not distinguishable by sex.

[1 figure, 1 table, 4 references] [Abstract: L. Baldwin]

Nicol, Joseph A. C., and Chase Van Baalen (Univ. of Texas, Fort Aransas)
Chemical Abstracts 70, No. 13, 55220x (March 31, 1969)

REFLECTING LAYERS OF FISHES

658

Mounib, M. S., and J. S. Eisan (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)
Comparative Biochemistry and Physiology 29, No. 1, 259-264 (April 1969) (Pergamon Press, New York, N.Y.)

Mounib (1967) showed that when sperm of cod (*Gadus morhua*) or salmon (*Salmo salar*) are incubated with pyruvate, at least three reactions take place: (1) reduction to lactate, (2) oxidative decarboxylation of pyruvate, and (3) fixation of CO_2 with pyruvate. Mounib and Eisan (1966 and 1968) demonstrated that salmon sperm are able to incorporate pyruvate, acetate, and glyoxylate into their lipids. The purpose of the present study was to examine the metabolism in salmon eggs of pyruvate and glyoxylate labeled with ^{14}C in different positions.

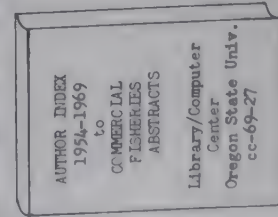
The results indicated that salmon eggs were able to fix carbon dioxide with pyruvate and that they metabolized glyoxylate via the glycerate pathway. The formation of ^{14}C -amino acids from the ^{14}C -pyruvate and ^{14}C -glyoxylate indicated the presence of an active transaminase system in salmon eggs.

[4 tables, 16 references] [Abstract: F. T. Piskur]

<p>7.9 (7.86)</p> <p>KEY TO THE IDENTIFICATION OF CANNED SALMON SPECIES BY SCALE CHARACTERISTICS</p> <p>Newton, Richard T., and James L. Burnett (Food and Drug Administration, 909 First Avenue, Seattle, Washington 98104) Journal of the Association of Official Analytical Chemists <u>52</u>, No. 4, 696-702 (July 1969)</p> <p>The purpose of this study was to develop a simple method to distinguish the five species of salmon in the canned product. The authors studied the characteristics of the patterns of the scales of the salmon. Salmon are usually canned with the skin on so that the characteristics of the scales may offer a means for identifying the fish contained in the can.</p> <p>The authors developed a key based on characteristic patterns of the scales to distinguish the five species of salmon (pink, chum, king or chinook, silver or coho, and red or sockeye). The scales are removed from the fish skin, examined under the microscope, and compared with the key to the scales of the various species. The method appears reliable, and the authors suggest that the method be subject to collaborative study.</p> <p>[6 figures, 3 references]</p> <p>[Abstracter: F. T. Piskur]</p>	<p>9.15 (9.19)</p> <p>UPTAKE FROM WATER BY SEVERAL SPECIES OF FRESH WATER FISH OF P,p'-DDT, DIELDRIN AND LINDANE; THEIR TISSUE DISTRIBUTION AND ELIMINATION RATE</p> <p>Gakstatter, J. H. Diss. Abstr., B. <u>27</u>, 3820 (1967) Journal of the Science of Food and Agriculture <u>20</u>, No. 6, 1-437 (June 1969)</p> <p>DDT, dieldrin, and lindane, all ^{14}C-labeled insecticides, were added in sub-lethal concentrations to water into which four species of fish (1 gram of fish per liter of water) had been placed. After recovery periods of up to 41 days, the rate at which the insecticides had been taken up from the water was determined by analysis of residues in the various fish tissues: DDT > dieldrin > lindane. The insecticides were distributed in various proportions among all the tissues, but concentration was greatest in visceral fat; it was least in muscles. High concentrations in the liver, gallbladder, pyloric ceca, and intestines were attributed to these organs' being in the route of excretion. Rates of excretion during recovery varied--more than 90 percent of the lindane was eliminated after 2 days and more than 90 percent of the dieldrin after 16 days, but about 50 percent of the DDT was still present after 32 days. All the insecticides were readily transferred from the contaminated fish to uncontaminated fish newly introduced to the recovery water.</p> <p>[Abstracter: L. Baldwin]</p>
<p>8.0</p> <p>BIOCHEMICAL COMPOSITION OF THE MUSCLES OF SOME BLACK SEA FISH</p> <p>Lisovskaya, V. I., and T. A. Petkevich (Odessa Otd. Inst. Biol. Yuzh. Morei, Odessa, U.S.S.R.) Chemical Abstracts <u>70</u>, No. 7, 26666s (February 17, 1969)</p> <p>CONFIRMATION OF CARNOSEINE AND ITS METHYLATED COMPOUNDS IN THE MUSCLES OF SOME ANIMALS</p> <p>Suyama, Michizo, and Michie Maruyama (Tokyo University of Fisheries, Konan, Minato-ku, Tokyo, Japan) Bulletin of the Japanese Society of Scientific Fisheries <u>35</u>, No. 5, 471-478 (May 1969)</p> <p>The authors undertook to identify the main imidazole dipeptide in the muscles of Delphinus delphis), bigeye tuna (Parathunnus mabuchi), sei whale (Balaeonoptera borealis), and snakes (Natrix tigrina and Elaphe quadrivirgata). The carnosine obtained from snake and dolphin extracts by the procedure of Nakai et al. (1966) and from dolphin extracts obtained by the method of Tsunoo et al. (1966) had the same infrared absorption spectra as did the ophidine (8-8-alanyl-2-methylhistidine) found in three species of dolphin by Tsunoo et al. (1966). The authors found no evidence of 8-alanyl-2-methylhistidine in the muscles of snakes and dolphin. They feel certain, on the basis of nuclear magnetic resonance spectra, that the compound designated as ophidine is identical with balenine (8-8-alanyl-3-methylhistidine).</p> <p>[5 figures, 12 references]</p> <p>[Abstracter: L. Baldwin]</p>	<p>9.14 (5.2)</p> <p>WATER-SOLUBLE VITAMIN REQUIREMENTS OF CARP--VI. REQUIREMENT FOR THIAMINE AND EFFECTS OF ANTITHIAMINES</p> <p>Aoe, Hiroshi, Isao Masuda, Tsuguo Mimura, Takashi Saito, Atuko Komo (Central Laboratory of Nishin Flour Milling Co., 117, Tsurugaoka, Ohi, Irumagun Saitama, Japan), and Sasaburo Kitamura (Oriental Yeast Co., 3-6-10 Azusawa, Itabashi-ku, Tokyo) Bulletin of the Japanese Society of Scientific Fisheries <u>35</u>, No. 5, 459-465 (May 1969)</p> <p>The requirement of warm-blooded animals for thiamine is closely related to the level of carbohydrate in the diet. Using the carbohydrate-rich test diet devised by Halver and Coates (1957) for estimating the carbohydrate requirements of chinook salmon, the authors added antithiamines (amprolium, pyridoxamine, or oxythiamine) to ensure the appearance of deficiency symptoms and fed variations of the diet to carp. For comparison, male chicks and the fry of rainbow trout were fed thiamine-deficient diets supplemented with thiamine and/or amprolium.</p> <p>After 11 weeks on the test diet, the young carp exhibited loss of appetite, fading of body color, congestion of the fins, and echymotic characteristics of the skin. Addition of amprolium caused similar deficiency symptoms. Pyridoxamine caused nervousness and loss of appetite and slightly retarded the carps' growth; oxythiamine caused no nervousness but it retarded growth markedly. These symptoms completely disappeared when thiamine was added to the diet. The carp withstood the thiamine-deficient diets and those supplemented with amprolium far longer than did rainbow trout and chickens. Thus the authors conclude that the 0.15 mg. of thiamine per kg. of body weight per day required by trout (Leitritz, 1959) is unnecessarily high for carp.</p> <p>[3 figures, 2 tables, 17 references]</p> <p>[Abstracter: L. Baldwin]</p>
<p>7.9 (9.19)</p> <p>DETERMINATION OF SOME CHLORINATED PESTICIDES IN VEGETABLE OILS, MARGARINE, BUTTER, MILK, EGGS, MEAT, AND FISH BY GAS CHROMATOGRAPHY AND THIN-LAYER CHROMATOGRAPHY</p> <p>Noren, Koldu, and Gunnar Westoo (Nat. Inst. Public Health, Stockholm, Sweden) Chemical Abstracts <u>70</u>, No. 7, 27683g (February 17, 1969)</p>	

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